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ABSTRACT

Since the publication in April 1979 of the Carnegie Commission's report on the future of public radio and television in the United States, the accelerating pace of technological change has become even clearer, and this study was undertaken to provide a more detailed review of new marketplace developments, examining both service and revenue possibilities for the public television industry. The first section of this report focuses on a proposed nonprofit cable network for performing arts, culture, and entertainment (PACE). The five industry reports which follow discuss the current status of domestic satellite communications, the cable television industry, pay television, the home video market, and videotext services. A financial projection and a prototype program schedule for PACE, a glossary of acronyms, and an index are also provided. (MER)

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K E E P I N G
PACE
WITH THE NEW TELEVISION

Public Television and Changing Technology

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Preface

For nearly two years beginning in June 1977, I chaired the Carnegie Commission on the Future of Public Broadcasting. The Commission examined the future of public radio and television in the United States and concluded that the institution, despite its many flaws, was a "national treasure" that should be expanded, supported, and improved.

The Carnegie Commission's recommendations and analysis, titled *A Public Trust*, sought to highlight the most important objectives for public broadcasting in the 1980s. Intertwined throughout our report, and often dominating our inquiry, was a technological time bomb that continues to tick away for all of broadcasting—the inexorable drive of innovation, and the inevitable disruptions that innovation creates in the status quo. After the primary issues of funding and structure in public broadcasting, we probably spent more time on the impact of new technologies than on any other matter. In fact, we devoted an entire chapter and an appendix to the implications raised by technological changes currently underway in the marketplace.

During the period since our report was published—a time characterized by extraordinary changes in both public and commercial communications—the accelerating pace of technological change has become even clearer. The House Communications Subcommittee began to debate sweeping proposals for updating the 1934 Communications Act. While public broadcasting institutions altered their own structures to accommodate the impending technological developments, more and more opportunities were announced in pay television, cable, videotext, satellites, video recording and playback devices, and related fields.

Prompted by these rapidly moving developments, the Carnegie Commission's Executive Director, Sheila Mahony, entered into an arrangement with Carnegie Corporation of New York permitting her and two other members of her staff to undertake a far more detailed review of new marketplace developments. It was seen as an opportunity to examine both service and revenue possibilities for

the public television industry. Ms. Mahony believed that the combined impact of the new media not only would present unparalleled future competition for public television, but such developments seemed to be occurring even more rapidly than had been previously thought.

Agreeing with the need and urgency of such a follow-up study to *A Public Trust*, Carnegie Corporation provided support for the report that follows. An informal advisory board was set up, comprised of myself; Alan Pifer, President of Carnegie Corporation; David Z. Robinson, the foundation's Vice President; Eli N. Evans, a member of the Commission and President of the Charles H. Revson Foundation; and Ms. Mahony.

The report in the pages that follow is, however, entirely the work of three authors—Sheila Mahony, Nick DeMartino, and Robert Stengel. Through their hard work, extensive interaction with professionals in the field, and their impressive insights, they have developed not only a unique examination of the new technology, but also a completely innovative concept in the communications field. Their proposed nonprofit cable network for performing arts, culture, and entertainment (PACE) is a solid, imaginative, and workable proposal. It deserves immediate and responsive consideration by our colleagues in public broadcasting, the foundations, the federal government, and the commercial cable television industry. Underlying and buttressing this charismatic idea are five industry reports, which in themselves are both a contribution to the literature and a road map for the immediate future.

I am proud to be associated with a work of such high quality. I am sure the conclusions of these authors will unleash considerable controversy. The latter is inevitable in a rapidly developing field. The real test of the authors' work, however, will be whether the considerable weight of facts and persuasion contained herein will prompt action of the sort that will assist public broadcasters in reaching for new heights in the coming years.

William J. McGill
President, Columbia University
Chairman, Carnegie Commission on the
Future of Public Broadcasting

April, 1980

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Introduction

This study, building upon last year's report of the Carnegie Commission on the Future of Public Broadcasting, expands that report's charge to public broadcasters to "broaden and become more flexible in [their] approach to the delivery of programs and services to the American public" in order to "expand audience programming options, provide for greater listener and viewer convenience, and make possible programming and services aimed at smaller audiences with specialized interests and tastes."[1] The advance of new communications technologies and attendant shifts in marketplace and regulatory activity seemed to necessitate a much more detailed examination of the ways that public broadcasting might accomplish these goals.

Our investigation was further prompted by the likelihood that new consumer markets for communications services might well be developed entirely by private, profit-making companies. One of the authors of the present report, in a speech in May, 1979, suggested that the public interest may be better served by the retention of a nonprofit voice in the media.

> "Public television, and the telecommunications applications it shall continue to pioneer, are like public education, public libraries, federal aid to the arts, sciences and humanities. They only buttress a much larger commercial enterprise and assure that merchandising doesn't totally take over the generation and distribution of knowledge. Public television, too, exists alongside the commercial media, and seves as a contrast to a purely market-driven industry—whatever its merits, successes and failures."[2]

With support from the Carnegie Corporation of New York, this study was undertaken in June 1979 by a special task force composed of Sheila Mahony, Nick DeMartino, and Robert Stengel, staff members of the Carnegie Commission. The authors began with two questions: what are the unique opportunities for service presented to

[1] *A Public Trust:* (New York: Bantam, 1979), pp. 223, 249.

[2] "Public Television and the New Technologies: To the Extent Marketplace Forces are Deficient." Remarks by Sheila Mahony to the Federal Communications Bar Association, May 16, 1979.

public television by the new technologies, and what potential do they offer for generating new revenues?

From the outset we decided to focus upon television, not radio. Public radio has, from its inception, faced the competition of an abundant marketplace. While technological development is providing new opportunities and challenges to public radio, the resultant changes, we believe, will be differences of degree, not of kind. The greater challenges are posed in the television marketplace.

To a great extent this investigation into the television marketplace represented a return to early professional concerns for all three authors. Prior to assuming the position of Carnegie Commision Executive Director, Sheila Mahony, an attorney, headed the Cable Television Information Center in Washington, D.C. As a member of the New York City Corporation Counsel's office, she was deeply involved in cable franchising. Nick DeMartino, an independent producer for public and cable television, was founder of the Washington Community Video Center and *TELEVISIONS Magazine*, both of which explored the development and use of new technology. Robert Stengel was a Vice President of the National Cable Television Association, a journalist, and a communications consultant for government and private groups.

The course of this investigation is evident in the organization of this final report. There are two quite different sections. Section I is a detailed recommendation and rationale for the creation of a new, nonprofit pay cable television network for the performing arts, culture, and entertainment, founded with the help of public television, and produced with its cooperation. Section II is a series of five industry status reports covering satellite communications, cable television, pay television, home video, and videotext services. Because of the different stages of development and the fundamentally different natures of each technology, these industry reports vary considerably in their approaches. The reports on more predictable markets, like pay television and home video, offer quite specific recommendations. The satellite communications report is intended to illuminate the critical role satellites will play in any future communications infrastructure, but that report makes few pointed recommendations for action by public broadcasters. In the case of technologies like cable television and videotext services, our primary recommendations are made in the knowledge that most decisions will be made on a purely local level. Videotext is, however, so new and untried that much of the material is highly speculative.

The entire project was initially organized around these five

industry reports. As we interviewed scores of experts, attended industry conferences, read background reports, and followed the unfolding events in numerous trade journals, we slowly focused our priorities onto the rapidly accelerating pay cable marketplace. The results of that more intense study are contained in Section I. The proposed new national pay cable service for the Performing Arts, Culture, and Entertainment—PACE, for short—is one for which we believe there is a consumer need, a financial market, and, most importantly, a social value.

In the development of the proposal for the PACE Network, we sought to achieve the following objectives:

- to identify a use of nonbroadcast technologies that could be self-sustaining and still within the broad educational and cultural mission of public broadcasting;
- to structure a nonbroadcast service that improves the chances of survival and success for the primary broadcast service;
- to find a new source of funding for the support of programming;
- to enable public television to use more of its own discretionary funds on those programs that are more difficult to finance through subscriber payment;
- to devise a financial and organizational structure capable of withstanding the rigors of the marketplace, while maintaining the integrity of public television's noncommercial mission; and
- to expand the opportunities for American artists, producers, and other professionals in the expanding communications industry.

PACE will be a major bridge for public broadcasting into the new technology of the future. It will be an independent part of the public broadcasting family. It will be separately financed by a mix of public and private funders intitially, and ultimately by its own audience, but as a quasi-public entity its creative decisions will always be anchored in quality, not profit. We see it as a major source of co-production with stations and independents.

The major public broadcasting institutions, foundations, and other funders will create it as a nonprofit agency to serve the American people, but it will be free to grow as an original, free-wheeling resource for new programs, many of which will also be seen on public broadcasting, but some of which will not.

As a support for the PACE concept, as well as for several of the other proposals, we offer a detailed study of the changing produc-

tion, distribution, labor-management, and exhibition practices in commercial and noncommercial film and television. With or without the implementation of our proposals, these practices will change for public broadcasters, labor and talent unions, producers and program suppliers. All may not agree with our conclusions, but reasoned negotiations and planning are, we believe, an absolute necessity.

Our conclusions were aided immeasurably by a useful, collegial process. The initial drafts were developed out of interviews and research made available by scores of experts in the various fields (see acknowledgments). Drafts of various chapters were reviewed by experts including Jeri Baker of Paul Kagan Associates/*Pay TV Newsletter;* David Lachenbruch of *Television Digest;* Paul Fox of the Federal Communications Commission; Eric Smith of the Public Broadcasting Service; John Carey of the Alternate Media Center; Richard Galkin, a cable and satellite consultant and Thomas A. Troyer, of Caplin & Drysdale. Additional editorial assistance was provided by a panel of readers, including Dr. William J. McGill, President of Columbia University and Chairman of the Carnegie Commission; David Z. Robinson, Vice President of the Carnegie Corporation of New York; Eli N. Evans, President of the Charles H. Revson Foundation and member of the Commission; and William J. McCarter, President of WTTW, Chicago. Major editing on the entire book was performed by Dennis Dort, Jeri Baker, and Jean Highland. The financial projections for PACE were developed with the assistance of Mr. Robin Carpenter of Management Analysis Center, Cambridge, Mass. Management support throughout the project has been ably provided by Deborah Mack, with assistance on the production of the manuscript from Carol Portnoy, Marian Nelson, and Barry Steiger.

We know that statistics cited in this report will become almost instantly outdated, because the industries we have studied are changing at breakneck speed. Moreover, changing market conditions may affect the precision of our highly detailed financial projections which are based on assumptions about today's realities. Our figures are based on the best information available as of March 1, 1980. We hope that the report provides a useful and accurate status report of the various industries as of early 1980, and that the proposals and suggestions contained throughout the report serve to stimulate rapid and effective action by America's public broadcasters, producers, artists, and others.

PART I

The Proposal for PACE

A new national nonprofit pay cable television network for Performing Arts, Culture, and Entertainment

CHAPTER ONE

SUMMARY

There is today a commanding opportunity to develop a new, national, nonprofit pay cable television network—an opportunity that we believe should be considered by public television.

For the first time in history, television technology and economics permit the creation of new networks at relatively low entry cost, because programs can be directly financed by viewers who will pay to watch them. It is now possible to serve the special interests and needs of these comparatively small groups whose tastes are not served by mass appeal, advertiser-supported television.

This new dimension of television came about in the 1970s with the networking made possible by the marriage of local cable television systems and satellite program delivery.[1]

This development has fostered two new types of cable television networks in recent years. The most successful are the national pay cable distributors. They offer commercial-free popular movies, sports and performances, supported by a special fee added to the cable subscription price. Also growing in popularity and number are "basic" cable satellite networks—program services added at no extra cost to the package of channels covered by a cable subscriber's basic monthly payment. Among this second category of networks are channels devoted to religion, children's shows, sports, legislative coverage from Washington, sponsored films, programs for ethnic minorities, and, soon, an all-news network and a channel for viewers over the age of 50.

Despite this clear drumbeat for special interest services, no pay or basic cable network has yet targeted those viewers interested in programs that fit the broad category of cultural entertainment and performing arts.

[1]For a more detailed discussion of these and other technologies, see the following rationale and the five industry reports attached to this brief proposal.

Because the arts are a source of enormous satisfaction to millions of Americans, they have long been cited as a prime example of the kind of offering that should be expected from the new alternative technologies capable of catering to special tastes. Yet no private entrepreneur seems to believe that there is sufficient demand to make such programming profitable enough to undertake such a venture.

We believe that there will soon be a large enough audience of cable television subscribers willing to pay to support a channel offering performing arts, culture, and related entertainment programs. Furthermore, we believe that *only* a satellite-delivered pay cable network will, for the foreseeable future, offer favorable enough economics for a venture of this kind. Other new forms of program distribution—broadcast (rather than cable) pay television, direct satellite broadcasting, or even an advertiser-supported cable network—will not be able to support a high quality arts network for a considerable period of time.

The pay cable network we propose could become a self-sustaining enterprise in the mid-1980s if programs of the highest standards are produced and acquired, if the service is imaginatively and knowledgeably packaged and marketed to customers, and if its operators carefully manage it.

Such a network can bring a greater volume and diversity of cultural programs to Americans in all parts of the country. It will become an indispensable part of the unfolding world of new television industries, and will permit a dramatic expansion in televised arts programming financed by those who want it most.

Our study has indicated that there is a growing market for an arts and culture cable network, that such a venture could be attractive enough to customers to become financially stable in a relatively short time, and that the cable television industry would be receptive to the launching of such a service.

Who should develop, own, and control such a service as the one we have described?

We are convinced that it is only a matter of time until some entrepreneurs will bring to market some type of pay cable network based on consumer interest in arts and cultural fare. As cable television grows, the profit potential of more specialized programming improves dramatically.

While private enterprise is fully capable of packaging and creating high quality arts products—it is done in many fields beyond television—we do not believe that this particular venture

would be developed as well in the private sector as it would by a nonprofit, tax-exempt entity. Nonprofit institutions like museums, performing arts companies, public broadcasting, and the like, must be primarily concerned with their role in fostering an educational and charitable mission—for example, the production, improvement, dissemination, and support of creative arts programs—and it is this mission that must be the central and ultimate objective of the enterprise.

The scale and cost of launching a new national arts cable network and its relatively modest return on investment compared to other options in the pay television business, have thus far limited the private interest in such a service. But, even if, as we expect, the evolution of the business changes private companies' assessments of an arts network, we believe that the pressure for profitability and basic dynamics of private enterprise will limit the quality and impact of the service. Day-to-day choices about programming policy, production finance, risk taking, and artistic taste and judgment can too often be subjugated to bottom line concerns. At the very least surplus revenues, i.e., profits, will more than likely be channeled to stockholders or to other new ventures. By contrast, tax laws and other strictures demand that nonprofit, tax-exempt institutions apply earned revenues to the fundamental mission of the institution.

A number of other institutions might be logical participants in a new pay cable network venture, including the cable television industry, noncommercial public broadcasters, performing arts centers and similar cultural institutions, program productions entities, and groupings of talent, labor, and artists. For many reasons, detailed in the following sections, we do not believe that any existing entity is likely to try to launch the kind of major new project that we are proposing.

We believe that a new organization must be created that will bring these important groups into a partnership with it. Because the service most closely resembles the professional and philosophical missions of noncommercial public broadcasting, we think that this institution should take the lead role in nurturing the new pay cable service.

The most logical vehicle for public television involvement in this pay cable venture would be through the Corporation for Public Broadcasting. Our estimates indicate that this new cable venture would require approximately $30 million in capitalization, which we project to be half loaned and half granted. We believe that CPB should become a lead funder, should assist in raising additional

grants, and should act as the guarantor of the loans, as it did in the financing of public broadcasting's satellite distribution system.

Public television's role in the new technology and, in particular, in helping to launch a pay cable network, is a bold step that will undeniably alter the structure of the existing institution, and will have a major impact on the future directions of the main broadcast service during the 1980s. Why should public broadcasters take such a step?

Our analysis rests on two assumptions that we believe make this difficult decision absolutely necessary. First, public television is the only nonprofit institution in society whose mission, as well as its professional expertise, makes it a natural ally to a noncommercial pay cable network. We strongly believe that the service provided to consumers would be immeasurably enhanced with the strong participation of public television, whose reputation for quality and high standards is unmatched, and whose support of the artists upon whose work the service will depend is unequaled.

Second, most of the impact that a new, nonprofit arts service on pay cable might have on public television is likely to occur sooner or later—with or without public television's involvement. We believe that public television producers and the stations around the country can gain directly from the creation of new arts programming—much of which could be carried in sequence, first on the cable network and second on public television—and indirectly by giving the present noncommercial television system some role in affecting the future competition it must face. Moreover, by starting out with a sister organization, the new pay cable service will be much more inclined to work together with public television than a purely commercial venture would. Such cooperation could be further enhanced by formal, board-level ties between the two institutions.

What would the consumer of this proposed service be offered for his subscription dollar?

The new service would be an arts "magazine of the air" for people interested in various aspects of U.S. and world culture. We call it the pay cable network for the *P*erforming *A*rts, *C*ulture, and *E*ntertainment, or PACE, for short.

Like the magazine reader, a PACE subscriber would not necessarily be attracted by every item offered during the month. But enough variety will be offered under the PACE umbrella so that the viewer could keep coming back for his primary interests, while

having the option to sample other material with which he might like to spend an occasional hour.

The common denominator among all subscribers is, therefore, different from that of network audiences, or even for those turning to the existing mass appeal entertainment pay networks. Subscribers will turn to PACE because of their love of the arts. Yet PACE's appeal can never become so exclusive as to fragment the audience into tiny minorities. The PACE philosophy would have to provide both the depth demanded by afficionados of a particular art form or interest area and an introductory approach for viewers with more casual interest in each of the specialties. Thus, PACE would offer all subscribers two categories of televised experience.

At the heart of the service would be performances and presentations of the works themselves. Each month the viewer would see theatrical motion pictures from the U.S. and around the world, both recent and vintage. There would be the best of the musical world, including opera, dance, symphonic and chamber music, vocal and instrumental soloists, cabaret and nightclub performances, jazz and other contemporary music. PACE would capture the magic of the legitimate theater—major plays from the commercial Broadway houses, regional theater and festivals, and avant garde performance programs from the great centers of aesthetic ferment in the U.S. and abroad. The service would also feature original and adapted literary works produced specifically for television—specials and TV movies, mini-series and long-form serials, and other formats designed to present the viewer with literary, dramatic, comedy, and historical works as realized by television artists. PACE would also explore other forms of artistic expression—visual presentations of special gallery or museum exhibitions, cultural and folk festivals, new presentations of fashion, architecture, and the decorative arts, and the video medium as a form of expression.

These direct experiences, always the featured programs in an evening's schedule, would be buttressed and surrounded by PACE's unique "signature": arts magazines of the air. The PACE "magazines" would focus on a single aspect among this collection of arts genres. Typically, a half-hour program would inform viewers about PACE's own upcoming offerings in the field, as well as provide a current perspective on the worldwide activities in classical music, popular music, theater, film, dance, museums and the visual arts, design, fashion and style, travel and leisure—and television itself.

Each of PACE's several signature magazines would feature a

well-known host—in effect, a "columnist" who can comunicate to a general audience, but who is widely known and respected by the experts. Each would have a strong identity with the PACE program service, and would be integrated into the month's most important events and developments, but would lead viewers into "behind the scenes" documentaries and interviews with leading figures. Some of these magazines might logically fashion special relationships with leading publications in the various specialty fields.

We do not purport to provide here and now a definitive approach to the offerings of a new pay cable network for the arts.[2] We mean, instead, to suggest the direction pay networks are likely to take, with some detail to show how the trend toward identifiable and distinct program services would affect the launching of an arts and culture network. The character and emphasis of the service, especially in its early years, would be defined by its management, by the kinds of programming available for acquisition, and by the complex web of decisions about new production arrangements that we outline in the following section.

We do emphasize here, however, that the concept of the PACE network must be seen as a premium television service. Subscribers must be willing to pay a monthly fee for it because it provides a real addition to their television viewing. PACE must be distinctive, useful, and first-rate.

The present program service that has pioneered consumer interest in arts and cultural programs is, of course, public television. Many of public television's cultural offerings would fit well into the concept of an arts pay network, and for this reason we devote considerable attention to the potential interrelationship between that institution and the pay network.

PACE has to be concerned first and foremost with finding and satisfying the customer interested in arts and cultural programming. PACE customers will have available to them other material presented on public, commercial, and cable networks, such as news, sports, instructional material, "target" audience programs, investigative documentaries, mass appeal variety and episodic shows, and religious programming. Similarly, while certain strands of PACE's programs will appeal particularly to specific segments of the overall arts audience—young people, older viewers, members of ethnic groups, teenagers, urban residents, and so forth—the essential distinction for all programs is their artistic value and integrity.

[2]A prototype schedule for PACE is offered for illustrative purposes in *Appendix B.*

This approach permits a narrower gauge of programming aimed at the PACE audience. At the same time, it demands greater depth and detail for each of the art forms presented on the service. Even within the more specialized scope of PACE's programming, a balance must be struck between programs appealing to as broad a base as possible, and those catering to more individualized tastes. Most PACE subscribers will probably want to watch an original production of a major Broadway play, for instance. But PACE will be able to range widely in its many areas of interest: regional theater, university arts festivals, ethnic cultural events, avant garde music and dance presentations, gallery openings, and retrospectives of established and controversial visual artists, international productions in translation. All this and more constitute the rich stock from which PACE could develop a program schedule of originality and diversity.

In short, PACE should alter popular concepts of "culture." While including the "high" arts like opera, ballet, symphony music, and traditional museum exhibitions, the service can broaden this definition of what has, in the past, been known as elite programming. Exploring the contemporary arts means a commitment to risk, to untried and unpredictable programming directions. PACE will be judged on the strength of its convictions as an artistic force in its own right, and will, therefore, constitute an extraordinary new voice for the extension and expansion of culture.

America has taken its place among the artistic capitals of the world, with a diversity, vitality, and sheer volume of activity unmatched in history. While not every aspect of this dynamic period can be captured for television audiences, we are convinced that there is far more than enough superior material, domestic and foreign, to sustain a service of unparalleled excellence—a service that people will pay for and enjoy month after month.

A summary of our estimates for the base case we tested appears in Table 2-B on p. 29. (Our basic assumptions, and the results of making other assumptions, are fully explored in *Appendix A.*) This base case, which we believe embodies the most reasonable set of assumptions, shows a break even point in the fourth year of operation, after signing up about 750,000 subscribers, roughly 3 percent of the total number of cable subscribers capable of being offered the PACE option. This plan would run a deficit for its first three years of nearly $30 million, but would become viable during its fourth year, based on our income and expense scenario.

As we shall see in subsequent sections of the report, these assessments are based on a large number of tentative assumptions about the future of technology, the alteration of government regulations regarding public television's allowable activities, and the willingness of all parties concerned to work together to launch this service. It rests as well upon an evaluation of the changing world of program production, distribution, and exhibition, which has dramatically altered the rules of the game for all broadcasters, the unions, producers, and viewers alike.

The rationale for this proposal, and for public television's role within it, is more fully presented in the next part of this report.

Here we have attempted to crystallize the call for a new programming service that can meld the dazzling abundance of the new television of the 1980s with a fundamental task that must be met by the best of our cultural institutions. That is the job of preserving, nurturing, and expanding those aspects of human existence that distinguish mankind. Long promised, long unmet, this mission of television seems to have another golden chance in a era of television choice.

CHAPTER TWO

Rationale and Background

"This has been a hard century for prophets," wrote James Reston at the close of the 1960s. "Each decade has tended to misjudge the next."[1] Because proclamations of "revolutionary" change are as routine in the television business as they are on television commercials, Reston's warning is particularly appropriate for a study of new communications technologies. Nonetheless, it is apparent that the nation *is* in the midst of a significant transformation in the way the television business works—and the way television works on us.

An array of new television programming alternatives has slowly emerged from the 1970s to challenge what was once seen as inevitable dominance by the three commercial networks. That dominance is changing under the pressure of new cable television satellite networks and home video devices like cassettes and discs.[2]

This chapter explores the recent changes that have given rise to these challengers, and sets forth in detail our proposal for a new pay cable network for the performing arts, culture, and entertainment, as outlined in the previous pages.

The scarcity of channels upon which commercial television is based is ending. It is now possible to supply most U.S. households with far more than the handful of broadcast stations available locally over the air. This proliferation of new choices for TV viewers is the result of technological innovation, government regulatory changes, and a shift in the viewing habits, behavior, and demands of the American public.

[1] *New York Times*, December 30, 1969, p. 16.

[2] Part II of this report contains detailed analyses of the following industries: satellite communications, cable television, pay television, the home video market, and videotext services.

The result will not mean the disappearance of commercial network television, but its gradual transformation under considerable pressure. Growth of overall television viewing will assure that network audiences will not decline in absolute terms. But the size of those audiences will not keep pace with the growth in television households—from 75 million today to nearly 90 million in 1989. Nor will additional viewing that comes from more sets per home, increased hours in front of the set, or additional viewing by today's light viewers automatically be added to the audience for commercial television. Instead, a substantial percentage of this new viewing is likely to be captured by other television options that have recently sprung up or that will be created in the next few years.

Simply put, the new systems of television dispense with the advertiser-middleman. The new systems are financed directly by viewers who want particular programs or services. The intensity of their demand, not the number of viewers, is the prime determinant in program selection and marketing. As more and more television households join the consumer financed systems of television, a larger volume and variety of programs become economically feasible for production and distribution. And, because each viewer pays a considerable sum for access to those programs, far fewer viewers are necessary for these new systems to be self-sustaining.

How did this evolution toward consumer financed television come about, and why did it happen in the mid- to late-1970s?

The Advance of Technology

There is no question that technological advances are the fundamental basis for the changes we are seeing in today's television world. The success of communications satellites, cable television systems, and consumer video electronics is today predicated on technological innovations that emerged only in the last decade. Yet it is worth emphasizing that no laboratory invention can have impact on society until it is brought into the market—often a long and complicated process involving a wide range of business, government, and consumer decisions.

The growth of cable television illustrates this point. Begun in the late 1940s as a way to provide and improve television reception in rural parts of the country, cable television is hardly new or revolutionary. Companies installed a network of cables and signal amplifiers throught a community. Through those wires came television signals, captured from nearby communities by tall antennas. For its

first 15 years, the industry operated as an adjunct to conventional broadcasting, literally called Community Antenna Television (CATV).

From the mid-1960s through about the mid-1970s, cable television passed into a second, and highly controversial era. To increase the attractiveness of cable service in new areas, operators began "importing" television signals from distant cities by means of microwave. They began filling vacant channels with simple automated time, weather, and news channels, and even originated new programs in their localities. As technology improved, the capacity of these systems became more sophisticated, growing from three to twelve channels, and beyond. It was becoming clear that CATV could conceivably threaten regular broadcasting, because it provided the pathway for far more programming than conventional television offered.

In 1965 the FCC began regulating cable, and over the next seven years passed increasingly restrictive regulations to prevent cable from growing and threatening conventional broadcasting. At the end of 1972, only 11 percent of U.S. households were served by cable—7.3 million subscribers.

The industry was stalemated during this period, and grew slowly until the mid-1970s, when a new technology—satellite communications—helped cable enter its most important phase and become a nationally networked programming medium.

Networking's advantage is in the economies of scale of simultaneous program distribution to hundreds of interconnected outlets. This interconnection was accomplished through a series of microwave links and cables leased from the telephone company. But ground-based, or terrestrial, systems are extremely expensive to build, and lease fees are high. Thus, additional networks became impractical to add.

In the mid-1970s, cable television was able to develop multiple national networks much more efficiently because of the new communications satellite technology. One of the primary benefits of the 1960s "space race" with the Soviet Union, these advanced electronic systems have had enormous impact upon virtually every aspect of our communications infrastructure. There are two requirements for a satellite system: the space component and the ground environment. The actual satellite orbits the earth 22,300 miles in space. Because it circles at the speed of the earth's own rotation, it remains stationary above a specified portion of the globe. Special transmitters located within its arc of coverage beam signals up to the

satellite. They are amplified and then transmitted back down to earth, covering an area that is determined by the satellite's power, design, and location in the sky. Under the shadow of this "footprint" are satellite receiving terminals, shaped like dishes, that "look at" one satellite, and can receive those signals of audio, video, and data that are transmitted. Depending on the design, up to 24 simultaneous channels of television can be beamed from one satellite; further advances are improving the capacity and performance of all the components of satellite technology.

In 1972 the Federal Communications Commission initiated what it called the "open skies" policy for satellite communications. Under this plan, relatively few limitations on entry into the satellite business were placed on firms that were judged to be technically and financially qualified. While satellites had been used to transmit voice and television internationally, and for many military purposes, the commercial domestic market was unknown. Nonetheless, a number of competing systems were launched, making possible satellite distribution of television programs to cable systems, as well as satellite communications for TV and radio broadcasters, publishers, businesses, and other users.

But what kinds of service would be economically attractive enough for cable operators to invest in the fairly expensive receiving dishes necessary to become part of a satellite network? Cable was already bringing subscribers programs from commercial and public television sources. Other new services were more often locally produced programs, or additional broadcast signals imported by microwave, when they were permitted under the still-restrictive FCC regulations.

The answer was pay television. Charging subscribers a fee for a special channel of premium programs, such as uncut movies and sports, had long been part of television's potential. In the early 1950s, equipment manufacturers petitioned the FCC to permit regular broadcast stations to be used for various systems of subscription television, known as STV. In 1962, the FCC authorized an experiment in Hartford, Connecticut. Similar ventures were tried around the country, but the concept proved unworkable in a single community because of high costs and unavailability of quality programming. When the FCC finally permitted companies to begin nonexperimental STV broadcasting nationwide, it was only under a set of restrictions on program content.

Cable entrepreneurs also wanted to offer pay television services, but they were limited by restrictions similar to those on STV:

many movies, most sports events, and all series were ruled out for pay channels. Nevertheless, a few entrepreneurs began offering pay cable channels on a community-by-community basis in the early 1970s, and the equipment required to differentiate the paying subscribers from other cable customers was developed and refined.

In 1973 networking came to pay cable. A firm named Home Box Office started distributing its pay channel by means of microwave transmission, just as ABC, CBS, and NBC interconnect their affiliates. When domestic satellites were launched in 1975, HBO made the critical decision to provide its pay service nationwide by distributing to cable systems over satellite.

Another important decision was necessary, however, before the concept of cable/satellite networks was proven. In 1976, the FCC authorized the use of smaller, cheaper satellite receiving dishes. Earlier models were ten meters in diameter and cost over $50,000 each. With relatively little loss of picture quality, cable systems could use smaller, and therefore cheaper, receiving dishes. Within months cable operators around the country hooked up to the new national pay cable network. Because the satellite system had the potential for many more networks to be carried along the same pathways, the HBO precedent ushered in an array of additional networks.

The next service to be added was WTCG, an independent broadcast station in Atlanta. It became the first "superstation," so-called because its local programming was distributed nationally by satellite.

During the next four years, nearly 30 satellite-delivered programming services went onto the satellites for use by the cable television industry. They offer religion, sports, children's programs, several radio and television "superstations," and the proceedings of the U.S. House of Representatives. Many of the new projects on the drawing boards promise original programs, notably the Cable News Network, a 24-hour, all-news service, and the New Prime Time, a channel devoted to viewers over 50. Other specialized new networks include those offering Spanish-language programs, black entertainment, services from England and France, and an entire BBC channel.

Some of these networks are supported by advertising, some by per-subscriber fees paid by the cable operators, and others are free. All of these services are on the same satellite system, along with HBO and other pay cable networks—Showtime, The Movie Chan-

nel, Galavision (a Spanish-language pay service), Home Theater Network.

The proliferation of new program services, as well as the delivery of pay networks via satellite, depended in part on the elimination of the FCC programming restrictions passed in the early 1970s. Although the FCC began to shift its views in the mid-1970s, the most dramatic change came as a result of court action that invalidated many of the regulations of the early 1970s. With changes in Congress, on the Commission itself, and in the Administration, a new philosophy of deregulation was gaining ground in the communications field.

Coming at a time when public and political perceptions of the goals of regulation were changing, more and more policymakers were willing to deregulate in order to increase competition. Partial deregulation in airlines and trucking had increased competition, so many in Congress and the FCC began looking for ways of increasing the communications choices available to consumers over the air, through cable, and by other means. Together with the limitations on FCC powers imposed by the courts, substantial competition was introduced into an evolving marketplace.

All of these developments in regulated markets were occurring at about the same time that the consumer electronics industry finally introduced a long-awaited and much ballyhooed home videocassette machine. After numerous companies had abandoned unsuccessful "home video" concepts, a unit called Betamax was introduced in late 1975 by the Sony Corporation. Unlike most of its predecessors, Betamax was not designed for those who wished to play back pre-recorded movies or other programs. Instead, the Betamax, and the other videocassette recorders (VCRs) introduced since 1975, were designed to enable viewers to record regular television programs off the air for later playback. More than one million VCRs have been sold to U.S. consumers in the past four years.

Today there are two incompatible home VCR formats on the market. In the next few years some 20 formats will be introduced, none of them interchangeable. The most important development will be the mass merchandising of videodisc systems, which will reduce the cost of initial equipment and develop the basis for a mass consumer market for pre-recorded video that the industry hopes will rival the phenomenal sales of long-playing audio recordings. For in many ways, the coming age of consumer-financed television was foreshadowed by the growth of home audio systems in the 1970s.

Changing Patterns of Consumption

While it is impossible to draw direct conclusions from statistics about U.S. media consumption habits in the 1970s, it seems fair to say that a growing number of people have become willing to pay for the right to control their home leisure environment.

For example, in the 1970s Americans purchased an unprecedented amount of home audio equipment—stereos, tape decks, turntables (nearly 5 million stereos; 16 million audiocassettes; 3.3 million cartridge players; and 10.5 million automotive players in 1978—total sales of more than $3 billion that year alone).[3] To feed these machines, some $22.2 billion worth of records and prerecorded tapes were sold between 1970 and 1978, reaching the $4 billion annual sales mark in 1978.[4] Between 1973 and 1978, the industry sold an average of 458 million "units," that is, records or tapes.[5]

These developments in audio have given rise to the electronics industry's hopes of creating a similar degree of consumer choice in television viewing by means of home video products.

While the size of the music industry grew dramatically during the 1970s, the motion picture business plateaued at around one billion tickets per year,[6] after two decades of box office slides. The typical consumer was younger, and the movie and music companies have catered to those changing audience tastes. This fact has had great impact on radio and television broadcasters as well, since so many of their programs originate as records and films.

Ironically, some major changes in the commercial television business may have helped pave the way for greater consumer willingness to try alternative programming. The growth and strengthening of independent commercial television stations, as well as public television, have given rise to more original programming. New part-time commercial networks have sprung up with a variety of new programs. The decade saw a considerable expansion of the program production industry because of the improved syndication market and, now, the nonbroadcast outlets. Heightened competition for ratings among ABC, CBS, and NBC also led to much less standard programming philosophies. "Stunting" to boost the ratings, the success of made-for-TV movies and mini-series, the strong emphasis on

[3]*Consumer Electronics 1979, Annual Review*, Electronic Industries Association.
[4]Recording Industry Association of America figures, total dollar sales at list price.
[5]RIAA. Equivalent units are measured as follows: 5 Singles=1 Album=1 Tape.
[6]National Association of Theatre Owners, *Encyclopedia of Exhibition, 1979*, p. 45.

movie and sports spectaculars have all led to less predictable viewer loyalty.

Networks now introduce new programs four times a year, rather than twice as in the past. And less popular programs are cancelled after four weeks, as opposed to 13 or 26 weeks in previous years. Coming at a time when some viewers were being offered the chance to subscribe to pay TV services, or to reschedule network programming by using a videocassette recorder, changes in the broadcasting business may have contributed to an attitude of "shopping around" in the television marketplace.

While the shape of the new television business is not yet clear, we do know that the results will all converge on the home television set and that rapidly increasing numbers of people are willing to pay for the privilege of choice. As choices are added to the basic, original use of the television, a new media environment is created.

So far, however, the content of almost all of the new services has largely been the programming from the old media—movies, sports, and mass entertainment. Only as the use patterns of consumers evolve and the structures of the new industries become established will the programming for the new technologies change. It is this area, of course, that concerns us most.

Industry Structure

The addition of a new market for television programming inevitably jostles patterns of consumption, ownership, and use. The development of these new markets will unsettle the arrangements that have existed since commercial television became the dominant entertainment outlet, just as the advent of television caused major disruption in the ground rules for movie production. This is evident in the short history of the existing pay networks and their impact on other media. To put this into context, we will review briefly the entertainment industry's basic business structure.

Underlying the entire industries of television and film is the somewhat complex concept of intellectual property. The creation of a television program or a motion picture requires the efforts of a number of professionals and organizations, many of which must share rights to the "intellectual property." These individuals and groups, including actors, musicians, directors, and creators of other existing art forms (composers, writers, photographers, illustrators, etc.), are divided into two groups: talent and copyright owners.

Talent, either individually or through the collective bargaining process, generally imposes conditions that may limit the distribution or use of the program. In addition, the use of the copyrighted works within a program (including music, nondramatic and dramatic literary material, photos, graphs, illustrations, fine arts, film clips, and whole programs) must be cleared and paid for under conditions that can limit availability of the finished program. In the case of talent, these issues are resolved by contract, and in the area of copyrighted works, by operation of the copyright law and contract law.

The producer can offer to distributors only those rights it has acquired from talent and the copyright owners, and as copyright owner of the completed program, can further control product availability.

In motion pictures, the producer—an "independent" or the studio/distributor itself—signs a series of agreements that license certain rights to companies that distribute in various markets. For the U.S. theatrical market, most films are distributed by the major studios, which assume costs of making prints, advertising, and promoting a film. The copyright owner may also license exhibition rights to television networks, local stations, foreign distributors, nontheatrical distributors, syndicators, and others servicing the various forms and territories of exhibition. The rights may be divided, packaged, and re-packaged in many different ways. The point is that distributors do not necessarily *own* a property, but rather *license* the right to use a film under conditions that are negotiated.

Similarly, in programs produced for initial broadcast on network or local television, a distinction is made between the ownership of a program and the use permitted under a license agreement. The networks own and produce some of their own programs, especially news, sports, and variety shows, and control subsequent distribution in other markets for these programs. For the majority of entertainment series and movies, the ownership rests in the hands of other producers—the movie studios and other "independents"—who can either assume the cost of further non-network distribution, or license the various uses to companies in each market.

Television had an enormous impact on the financing and distribution patterns of theatrical movies. The new television industries of pay and home video are having a similarly important impact on their predecessor entertainment industries. Movies once had a single market: theaters. Now they have a dozen, traveling through a sequence of play that includes various theatrical runs, network and

syndicated television in the U.S., foreign theaters and television, pay television in its various forms, videocassette and/or disc, nontheatrical 16mm and 8mm film, institutional audiovisual. Any time a program travels to a new "subsidiary" market, all of the parties to the initial copyright arrangements must be satisfied, involving new "clearances," i.e., negotiated payments and contracts.

The viability of the new television marketplace has challenged the established concepts of program sequence of play. The networks, like the theater exhibitors before them, fought pay television. They charged that pay television would "siphon" products from advertiser-supported television.

By collecting fees from viewers, they said, pay television would soon amass such large sums that it would be able to outbid the networks for major movies and sporting events, thereby jeopardizing the existence of many local broadcasters and curtailing the supply of programs available without charge over the airwaves. They claimed that pay television would "siphon" their lifeblood—the supply of quality programs.

But the movie companies do not see it in the same way. One studio executive explained in 1975:

> Pictures will move from one medium to another, with each medium paying less than did the one before, as the film becomes increasingly exposed. Thus, just as a film generates $5 or $6 per customer on a New York City showcase run, and perhaps only $1 at a drive-in or neighborhood house, its value decreases as it moves through the various levels of TV exhibition. Pay cable may pay 35 to 45 cents per subscriber to rent the film, a TV network may pay 7¢ per viewer, and the film may generate as little as 1¢ per viewer when it reaches independent TV station syndication. . . . Because the value of a movie goes down, not up, there can be no such thing as siphoning, in the context that it has been used at the FCC. Only a lower medium can siphon from a higher medium, and not the other way around. Pay TV is a higher medium than commercial TV, in the sense that it is required to pay more to obtain its product.[7]

As more and more layers are added to the distribution chain, the options for release patterns become more numerous. However great the discomfort of various existing parties, the flexibility to accommodate others is really a matter of willingness to do so. And while program suppliers do not lightly antagonize established buyers, they are equally eager to support new ones.

[7]Paramount Vice President Peter Kuyper, quoted in *Pay TV Newsletter*, July 30, 1975.

At present, it is not this struggle among different sectors of the entertainment business that is central to the question of new program production in the pay and home video markets. If pay television is to advance beyond simply rearranging existing product, the organized talent and labor unions in the communications industry must agree on a basic approach. To date, this has not happened.

The Role of the Unions and Guilds

The entertainment and communications labor organizations are a reflection, to a large degree, of the way the business grew. The oldest group of unions emerged from the legitimate theater, vaudeville, and musical performances. The legitimate stage has an array of guilds representing talent. The International Alliance of Theatrical and Stage Employees, AFL-CIO (IATSE), also traces its roots to the theater, representing workers skilled in specific crafts like lighting, makeup, costume, set construction, and many others. As motion picture production and then television grew, IATSE guilds were added for photographers, lighting, audio, and other technical jobs.

Two other technical unions dominate most network and local television. The National Association of Broadcast Engineers and Technicians (NABET), which began in radio at NBC, holds the national contract for that network and ABC, which split off from NBC in the 1940s. The International Brotherhood of Electrical Workers (IBEW) holds similar pacts with CBS. Many public television stations also hold contracts with these technical unions.

The cost of technical labor is usually calculated as a "below the line" expenditure—that is, the workers covered by union pacts are paid set fees for their work that are determined by negotiated agreements, and do not generally earn subsequent residual payments. They are, in effect, salaried employees.

The talent guilds in film and broadcasting are different. Their fees are often "above the line" expenses because the unions that represent them have negotiated additional residual payments or royalties for various forms of exhibition. The principal guilds are: the Screen Actors Guild (SAG), the American Federation of Television and Radio Artists (AFTRA), the Directors Guild of America (DGA), the Writers Guild of America (WGA), and the American Federation of Musicians (AF of M).

The most essential tool of the above-the-line unions is the same: a minimum basic agreement (MBA) with an employer. The MBA establishes the terms of use for programs: minimum initial

payments and residuals (payment for any additional use); the number of plays; size of territory; and other terms and conditions of program exhibition.

As we have described, PACE will enter a communications and entertainment business in the midst of an historic shift in the structure of program production and exhibition. Creative workers are as interested as employers in determining the apportionment of the new revenue that is being created as a result of their talents. Contracts negotiated under the old rules must be revised and labor wants to make sure that new arrangements guarantee job security and compensation.

Thus, terms for the production of original first-run programs for the new markets of home video, pay television, and cable were deliberately excluded from MBAs negotiated between the guilds and the traditional employers, principally Hollywood studios, the networks, the record companies, and independent TV producers. (The MBAs do cover the exhibition of movies on pay television and home video distribution, because these markets are seen as "subsidiary" or "supplementary" to the primary initial release in theaters.) Nor do all of the major talent unions yet hold contracts with the new employers, that is, the pay networks and the producers supplying programs to these markets. Only two unions, the AF of M and AFTRA, have negotiated pay TV contracts at this writing. The program format that has so far dominated pay television's limited original productions is musical and stage performances, which require contracts with the unions representing musicians and actors. In addition, the pay networks have contracts with the engineering unions, in order to transmit signals.

However, no pay television or home video contracts have been negotiated with DGA, WGA, or SAG by the pay networks, studios and other producers, or the record companies.[8]

Most of the industry attention centers on the dispute between the Directors Guild of America and HBO. The DGA, as one of the most powerful of the entertainment unions, is making demands that HBO has refused, not only because it rejects the directors' demands for a percentage of gross revenue, but because of the precedent-setting impact the directors' pact will have on negotiations with writers and actors.

[8]DGA signed one pay TV contract with a small independent producer, BMR Concepts, at terms unacceptable to other producers. Negotiations by several of the guilds and major studios are underway; the IATSE stage unions, considered essential for pay TV production of theatrical productions, are opening talks as well.

We expect 1980 to be a year of decision for the pay television industry's labor relations, setting the stage for the several major contracts with the studios and networks that are due to expire in 1981. Pay TV and other new technologies will certainly be part of these negotiations.

Meanwhile, both HBO and its competitor Showtime are using some non-union or pseudonymous talent to produce original programming in increasing number—an estimated 150-200 specials, pilots, and episodes will be completed in 1980. Unless a union settlement is achieved, DGA or WGA talent will be banned from pay television work, at least under their own names.

Whether union contracts are signed in the pay television industry sooner or later, pay is now firmly launched as a major element in the home entertainment and information mix.

A New Program Medium

The dramatic rise in revenues for the cable industry, fueled principally by the pay services, is making possible new programs and new networks. Table 2-A provides one authoritative projection of the cable industry's growth.

For many years the broadcasting networks, theater owners and other firms that benefited from the existing structures opposed the expansion of cable, pay cable, and the other challengers. Now that the cable industry has largely won regulatory and court battles and revenues are accumulating faster than many predicted, virtually every major firm in communications has established or purchased a unit that will stake out a claim in the new television businesses. In addition to the networks, major station groups, Hollywood studios, record companies, and other entertainment giants, companies like Dow Jones, IBM, American Express, McGraw Hill, and AT&T are becoming active in the field.

If both old and new private competitors feel the necessity of entering the new cable and home video markets, what about public television, only a decade old as a national communications service? Public television has itself been the beneficiary of technological change, becoming the first national broadcast service to interconnect by satellite. It has worked long and hard to secure its small share of financial resources and has nurtured a growing audience by defining special qualities that differ considerably from its commercial counterparts. And, despite its noncommercial character, public

Table 2-A Cable TV Industry 10-Year Projections

At Year End	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
New miles constructed	50,000	50,000	50,000	50,000	50,000	40,000	35,000	30,000	25,000	20,000
New homes passed (mil.)	5.0	5.0	5.0	5.0	5.0	4.0	3.5	3.0	2.5	2.0
New basic subs @ 40% HP	2.0	2.0	2.0	2.0	2.0	1.6	1.4	1.2	1.0	0.8
Total year-end basic subs both new and old (mil.)	19.1	22.3	25.6	29.0	32.4	35.6	38.7	41.7	44.6	47.5
Net increase in year-end subs (mil.)	3.1	3.2	3.3	3.4	3.4	3.2	3.1	3.0	2.9	2.9
Total homes passed (mil.)	40.0	45.5	51.2	56.7	62.3	66.9	70.9	74.5	77.6	80.2
Total pay subs (mil.)	8.4	10.5	12.6	14.8	17.0	18.9	20.7	22.4	24.0	25.4
Basic revenue @ $100/yr/sub (billions of $)	$1.9	2.2	2.6	2.9	3.2	3.6	3.9	4.2	4.5	4.8
Pay-cable revenue @ $120/yr/sub (billions of $)	$1.0	1.3	1.5	1.8	2.0	2.3	2.5	2.7	2.9	3.0
Total basic + pay revenue	$2.9	3.5	4.1	4.7	5.2	5.9	6.4	6.9	7.4	7.8

•Paul Kagan Associates, from *Pay TV Census*, June 30, 1979.

Source: *Cablecast*, Paul Kagan Associates, Nov. 16, 1979.

television competes for viewers, for programming, and for talent with both new and old commercial program services.

As viewer habits change, as federal policies toward competition and the marketplace evolve, and as new challengers become stronger and stronger, what, if any, role will public television have to play in the television environment of the 1980s?

It is our judgment that public television can best contribute to the evolving world of new programming by helping to launch the new nonprofit pay cable network we have called PACE. In evaluating the options that face public television during this important transitional period in U.S. communications, we developed a number of strategies, which are presented in Part II's various industry reports. PACE is not a distant prospect—it could begin relatively soon because growth in the cable television industry is more easily predicted in the next five years than in any of the other new television businesses.

The PACE project offers great potential for public television to contribute to the growth and improvement of new programming services in a fashion that is consistent with its current mission. PACE can provide a direct source of new programming and funds. Most importantly, the project would represent an important and valuable new service for the American public.

The existing pay services have restricted their fare to movies, sports, and broadly appealing entertainment in order to reach the largest number of potential customers. They are unlikely to alter this philosophy by adding much special appeal programming that would jeopardize their mass audience formulas. Satellite-delivered networks that are not full-time pay channels have ignored the culture and arts sphere, except in a few isolated cases.[9]

We believe that a service focusing on the broad category of performing arts, culture, and entertainment is the likeliest new service to appeal to cable's growing audience; and it is certainly the most glaring gap in the new menu of satellite-delivered services.

It appears that any method of distributing and financing an arts service other than a networked pay cable channel would not be economically feasible at this time. It is almost certain that cable operators themselves would not be willing to subsidize such a service, since arts programming involves very expensive talent and

[9]A number of companies are beginning to distribute foreign programming on a less than full time basis. All of it is advertiser-supported, and until recently was not satellite-distributed. Cable operators carry the programming on their own local channels, much as they would any other syndicated fare.

high production costs. The other major source of revenue is advertising. Most of the new "basic" cable networks are premised on a yet unrealized growth in advertising revenues as cable expands its market. Cable's advertising revenues were estimated at $4.85 million for 1978.[10] The ESPN sports network, Madison Square Garden sports events, the new Cable News Network and New Prime Time networks all rely upon new advertising sources for their eventual financial viability. Building cable into an advertising medium will require time, considerable capital, and substantial risk.

The question is not only whether cable as a medium can draw advertisers away from radio, television and print, but whether individual services can deliver measured audiences to particular advertisers. Measurement of cable audiences is only in the formative stages, and the kinds of demographic data that advertisers are accustomed to using are not yet available.

Moreover it is highly questionable whether advertising support will be an efficient or appropriate basis on which to launch an arts and culture channel. Ultimately, such a network would be driven to maximize its audience to attract advertisers. Even if this were not so, it is doubtful that it could compete on this basis for some time to come, given the preeminent requirement for high quality and very high priced programming to attract the arts audience. It may be that some kind of arts-oriented program service could be supported by advertising revenues but it is unlikely that it could be a high-quality offering of the scale we are proposing.

Thus, we turn to the economics of subscriber-supported pay cable networks to determine the viability of offering a cultural channel to U.S. viewers. Our optimism about pay services is not speculative. During the past 2 years the industry has realized heretofore unpredicted demand from consumers for pay services. In newly cabled communities, as many as 60 to 90 percent of new subscribers take a pay option along with the basic service. Several cable operators are now offering two or more different pay channels, and have found that 50 to 60 percent of their subscribers are actually willing to pay for more than one. Total cost for a basic cable subscription plus two or more pay channels is nearly $30 monthly. Only a few years ago, the ceiling was put at $18. No one dares to predict any more the "choke point" at which consumers will stop paying for programming alternatives they want.

To fuel this new demand, the pay cable industry is beginning to expand in its program offerings. As noted, HBO and Showtime,

[10] *Broadcasting*, December 3, 1979, p. 64.

the two largest networks, will buy or produce upwards of 150 original made-for-pay programs this year—all this without certain key union contracts that would permit further exploration of new genres. Each network is eager to differentiate itself from the other, since more and more cable operators seek new revenues by carrying both. The trend to origination is prodded as well by the fact that Hollywood theatrical movie output remains inadequate to fill the networks' thousands of program slots.

HBO and Showtime have both considered the creation of additional full-time pay networks with different "signatures." Their market research indicates that the largest market would be achieved by an "action-adventure" channel featuring "R" rated movies. Neither has, at this point, been willing to enter this market. At the least, both can be expected to add a few such items to their overall schedules.

PACE aims in precisely the opposite direction.[11] The idea of an arts and culture channel on pay television is not new. Sylvester (Pat) Weaver, former head of NBC, proposed an STV system in the 1960s that would have featured performing and dramatic arts of the highest caliber, on the assumption that by shifting financial support from advertisers to subscribers, a viable business could be built on the small, but intensely loyal, audiences for the arts.

Since 1972, Lincoln Center for the Performing Arts has investigated numerous possibilities for a pay cable service featuring its own resident companies, before and after its highly successful "Live from Lincoln Center" series on PBS.

Those earlier proposals for an arts channel lacked a firm economic base. The very idea of direct consumer payment for *any* kind of television, much less the more specialized channels under discussion, had to be proven.

It took HBO five years to amass the 750,000 subscribers it needed to become profitable. Only when the potential subscriber universe is large enough does it make sense for a network to appeal to narrower tastes in an effort to collect a paying audience of that size. We believe that time has come, if the right program package is designed.

[11]In recommending a new arts and culture magazine of the air, we considered and rejected other possible concepts, such as a pay channel for news and public affairs, one for education, instruction, how-to, or for-credit classes, or a premium children's pay service. Even though these are areas in which public television excels, we do not believe a sufficiently broad paying audience yet exists to support production and distribution costs. In addition, there are current or planned basic cable services specializing in some of these areas.

There are several reasons why we believe the cable industry would welcome the addition of PACE as an option for its subscribers. First, we canvassed dozens of cable operators and virtually all were enthusiastic about being able to offer a performing arts pay option. We take this as a reflection, not only of a trend toward differentiation in pay services that will be remunerative for cable systems, but also of subscriber interest in first-rate arts programming. Secondly, by offering a service like PACE, the cable industry can realize one of the important policy objectives posed for the industry many years ago: programming diversity through a multiplicity of channels. We are also certain that the addition of PACE as an option for subscribers to new systems will be welcomed by franchising authorities interested in having their citizens' viewing alternatives enlarged. Finally, and not insignificantly, the service will generate considerable new revenues for cable systems offering it. Since we assume a 50-50 split between PACE and the cable operator, as much revenue as we project for PACE will be received by the cable industry as well.

The "Base Case" for the PACE Network

Having determined that the support of a cultural service could be best accomplished through a full-fledged pay cable network, we developed a financial model for PACE, in cooperation with the Management Analysis Center of Cambridge, Massachusetts. Considerable detail about the model and the alternatives we tested are discussed in *Appendix A*.

Table 2-B presents a summary of the base case, which is predicated upon the most reasonable set of assumptions about how PACE could work.

This base case is dependent upon a number of interrelated factors: projections of the cable industry's growth, the universe of cable subscribers to whom this service could be offered, the percentage of those households that are likely to become subscribers (i.e., the estimated "penetration"), the probable length of time it will take before half of those subscribers become customers, the average service fee that PACE will charge the cable operator per subscriber, costs for both program and non-program activities, and the method of financing.

All of these factors are discussed in detail in *Appendix A*. Here we concentrate on the nature of the program service, how it will operate, who should operate it, the sources of its programs and

Table 2-B Summary Report of Base Case (in millions)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total Basic Cable Subs	25.600	28.972	32.440	35.611	38.692	41.690	44.615	47.474	50.277	53.034
Eligible PACE Universe	16.829	20.929	25.065	28.848	32.490	36.003	39.399	42.691	45.891	49.013
Tot. PACE Subs	0.174	0.387	0.627	0.870	1.113	1.350	1.579	1.798	2.008	2.208
PACE Revenue	9.374	20.910	33.837	46.979	60.092	72.908	85.270	97.113	108.418	119.205
Programming	18.281	22.319	26.843	31.443	36.032	40.517	44.845	48.990	52.946	56.722
Tot. Operating Exp.	23.294	28.267	33.946	39.679	45.332	50.984	55.819	60.403	64.779	68.953
Interest Exp.	1.570	2.102	2.661	3.514	3.418	3.247	3.436	3.618	3.791	3.957
Depreciation Exp.	0.100	0.190	0.221	0.224	0.202	0.206	0.186	0.192	0.173	0.181
Annual Surplus (Deficit)	−15.590	−9.649	−2.990	3.561	11.141	18.468	25.829	32.900	39.675	46.114
Cum. Surplus (Deficit)	−15.590	−25.239	−28.230	−24.668	−13.528	4.940	30.769	63.669	103.344	149.458

its unique relationship to public television, performing arts centers, talent, producers, and the cable industry.

In operational terms, PACE would be most analogous to the existing pay cable networks. The service would be distributed on a satellite serving the cable industry in the U.S., and offered to cable systems with receiving dishes.[12] The cable systems would sell the service to subscribers, and would be responsible for all equipment installation and service. We have assumed a monthly subscriber fee of $9.00, which would be split equally between the cable operator and PACE; thus each subscriber represents $4.50 in revenue to PACE. The PACE Network would be responsible for programming and national distribution. The two sectors share costs and responsibility for marketing and promotion.

Our model assumes that PACE would initiate full-time service in January, 1982. At that time, participating cable systems would market a service offered for about six hours per night, seven days per week, plus an additional seven and one-half hours each weekend, for a total of about 210 monthly hours of service. Just as with HBO or Showtime, PACE's scheduling would be built around multiple plays for each program during its premiere month, and selected encore presentations in subsequent months. PACE would begin operations with approximately 20 to 25 original presentations each month, and expand the number of original presentations as revenues grow.

Appendix B presents a prototype PACE schedule for April 1980, designed to illustrate the type of programming that might be assembled if PACE were a mature operation today. This table doesn't purport to consider costs, union agreements, or negotiations with distributors or performing arts companies—it is merely illustrative. (For a more detailed discussion of program costs, see *Appendix A.*)

As *Appendix B* shows, our concept for PACE is built around a nightly schedule of 3 to 7 programs, depending upon their genre and length. As we have outlined the concept, PACE could include nightly "magazines" focused on one art form. There might be seven in all,

[12]We acknowledge that current capacity limitations on the "cable satellites," particularly for prime time transmission, pose a serious problem. If PACE cannot gain access to a satellite providing other cable services, its cable market would be quite limited initially and this might alter our proposed timetable. However, ultimately we think that technical advances in both earth station and satellite design, the planned launch of new satellites (by RCA, Hughes, or Southern Pacific), the opportunity for transponder subleasing, the increase in cable systems with multiple satellite reception capability, and even possible regulatory changes will ameliorate this situation.

each repeated four times during the month. In addition, a "major" event would anchor the evening's offerings, whether it be a motion picture, opera, drama, mini-series, or musical event. Additional programming material in the various fields covered by PACE would be scheduled in and around these nightly offerings. Other factors would affect various programming strategies: Is the program live? If so, is it daytime or nighttime? When does PACE service begin and end each night? Are additional weekend hours added during afternoons or late nights? Is there greater appetite for one genre over another? Do subscribers value the added convenience of multiple program runs more or less than the volume of original material? As revenues rise, are they used for greater volume or more elaborate programs?

These and many more questions are decisions facing the operator of the service. More relevant at this point are the source and availability of the product. For this strikes at the heart of the new service's contribution to the expansion of the program market and its relationship with all existing parties in the market today, mainly public television, film distributors, talent and unions, and performing arts centers.

Programming Sources

There are three categories of programming sources that will supply PACE under our plan.

1. *Acquisition of existing programming* This includes both domestic and international motion pictures, made-for-TV specials and mini-series from a variety of sources, international productions of various program types (opera, dance, music, drama, etc.) and domestic independent productions.

2. *Co-productions* These include two types of co-production. First is the typical definition: participation in pre-financing of production in exchange for exhibition rights. The second would be the co-production with U.S. public television for material that would premiere on pay TV, and would then be broadcast throughout the U.S. on public television stations.

3. *Original productions for pay TV* These programs would premiere on PACE, which could then sell off rights to other outlets, including PBS, at an appropriate rate. Unlike co-productions, the principal costs and responsibility for original programs would be borne by the pay TV service.

Several important considerations go into a plan that relies upon these sources of programs, and all are associated with business negotiations no one can predict. Furthermore, all of these arrangements for programming require, to a greater or lesser degree, a cooperative relationship between public television and the new PACE service.

Acquisitions. The opening of a new pay cable market for the acquisition of programming will have two important consequences. First, PACE will create a market for a substantial amount of programming that is not distributed on television at all in this country. Among these products we can include many foreign-language motion pictures, made-for-TV programs in English and other languages, domestically produced films and videotapes which are not purchased by any outlet. By expanding the distribution for such product, PACE will help encourage the development of more programming. This is particularly true in the field of independently produced U.S. theatrical films.

Second, and more important, is the overlap between programs that might be appropriate for PACE and for other television services, primarily though not exclusively public television. As new services develop, programming will become more scarce during the interim while the bulk of every schedule is existing, not new, product. Herein lies one of the greatest advantages of a new, nonprofit pay service that is firmly allied with public broadcasting. Together they would represent more significant buying power than either would alone. By working out arrangements for appropriate sequence of play and the number of runs in that play, PACE and PBS could reduce costs and improve their collective clout.

At the present time, for instance, PBS is interested in acquiring many foreign motion pictures. Despite their high quality and international stature, many of these pictures have relatively little chance for sale in present pay television or commercial broadcasting markets. Nevertheless, PBS is often unable to pay the asking price for many of these movies. Even though PBS has a relatively small total audience, it is capable of exhibiting a film to virtually the entire U.S. population, thereby diminishing the value of its future exhibition in most communities. The distributors generally have an entry price, below which they will not negotiate, no matter how minimal the impact of exhibition might be. By adding the relatively small PACE audience to the offer, a distributor could come out with adequate compensation, while both public television and PACE would enjoy mutual access to new product. Exposure on a pay service whose total

subscriber base will remain below 1 million for many years will scarcely diminish the value of an acquisition to public television, which can reach many millions more with the same program. Since pay television is a "higher" medium, in that it pays more per subscriber for product than broadcasting, it must demand prior release.

PACE, of course, would acquire and exhibit a considerable range of product that currently never appears on public television or anywhere else. Even though PBS might continue to reject certain contemporary British productions or many foreign language productions, PACE could negotiate similar rights for subsequent broadcast use with those public stations that might themselves care to acquire a particular product. (An example might be the licensing of *Monty Python* or *The Glittering Prizes*, which at first many public television stations chose not to carry.)

As for acquisition of domestic production, the insertion of a new, more selective pay television "window" for U.S. filmmakers would only increase those artists' revenues, thereby inducing increased production. By adding a new, major distribution outlet, third-party funders would be more encouraged to back new and risky projects.

Co-production. Co-production is the most efficient method of spreading financial and artistic risks among many parties. As we have indicated in our discussion of sequence of play, motion picture, television, and pay television program production are often premised upon advance financial commitment by various entities that guarantee capital in exchange for rights. Movies now realize significant portions of their production budgets from "pre-buys," or guarantees from pay television, as well as the more typical guarantees from theaters and networks television.

Public television has increased its co-production activity in recent years, both receiving and making investments. A major British project like the *Shakespeare Plays* almost always begins production with foreign co-financing. Public television obtained rights for U.S. broadcast by arranging for investment prior to production. Similarly, the KCET production, *Cosmos*, budgeted at $8 million, has received advance foreign investment.

Public television has also begun to co-produce with other U.S. entities. ABC has bought limited rights to *The Vietnam Project*, a major PBS retrospective documentary. Stations are discussing similar arrangements with HBO and Showtime and for home video. The obvious benefits of co-financing arrangements are to stretch public television production dollars, and increase the number of good

programs. But, as we indicate in Chapter 5, extensive and full-scale co-production with commercial pay television becomes more complicated because of the unresolved rights issues that public television is relatively helpless to affect at this time without jeopardizing its own broadcast contracts.

We believe that a new, nonprofit pay television network like PACE would be in a much better position to co-produce with public television than any of the existing commercial entities. First of all, the two programming entities would find more objectives in common. Second, if public television producing stations are going to open delicate negotiations for entry into the pay market, it would seem more consistent with their mission to do so in cooperation with another nonprofit agency that could demonstrate its commitment to the mission of expanding the audience for performing arts and cultural entertainment. Just as PBS audiences will never be as large as commercial network audiences, so too the total subscriber base for PACE is likely to remain a modest percentage of the overall cable universe.

The prospects of increased PBS/PACE co-production is good news for a finance-starved public television system. The generation of additional revenues directly from subscribers can provide a substantial pool of unencumbered production money that can directly benefit the PBS system in several immediate ways. First, by stretching public television's production dollars for cultural and arts programs, PACE frees up funds for other types of PBS offerings. (For example, certain programs financed today in part by PBS's Station Program Cooperative could be co-financed by PACE, which would permit the inflation-racked SPC to turn to other, pressing programming needs.)

Secondly, station producers that can tap this new source of program production income may well be permitted to apply it toward federal matching funds. This new infusion of funds simply adds another, untapped source of production money into the overall PBS mix.

Finally, PACE would doubtless undertake co-productions with other entities outside the PBS family. PBS might have the option of pre-investing in some of these, thereby adding more to the catalog of programs for public television exhibition.

Again, the viability of this concept requires a public television commitment to a new sequence of play created by adding PACE exposure to certain programs that would subsequently be offered to nationwide PBS audiences. We believe public television, with a

relatively small sacrifice in the early days, would realize enormous long-term program development benefits.

Some public broadcasters may, of course, worry that a healthy PACE cable network could, in the long run, become an adversary and a competitor in the program and audience marketplace. Undoubtedly, this is true to some extent. However, the benefits of additional programming and funds will continue to be a powerful common incentive. In any event, we project that it will take over a decade for PACE to attract the number of subscribers approaching PBS stations' present total of nearly three million members. By the time the number of subscribers to PACE becomes large enough to offer any direct numerical competition, the overall revenues will be sufficient for it to finance more fully its own programs and provide them for public television broadcast at even lower prices.

It is worth noting that prior exposure on a premium service like PACE may have a much more positive impact on public television viewing than one might assume at first glance. A substantial part of the value of properties like motion pictures is derived from word of mouth, prestige, advertising, and reviews. If PACE exposes a program to a small section of the potential audience, including opinion makers, the press, and the industry, we believe that subsequent public television play would be enhanced.

Original production. This final source of programming is the most exciting and important contribution that PACE can make to the American viewing audience, and to the creative arts community. Public television has, in the past decade, succeeded in bringing the arts to more Americans around the country than ever before in history. Its impact on box office attendance in fields like dance, opera, independent film, and serious music has been salutary and symbiotic. PACE will expand that capacity even more, because it can cater to a specialized arts audience to an even greater extent than public television can. As it matures, PACE can produce or commission a range of televised productions unparalleled in television history and contribute to the viability of hundreds of artists and performing companies that are today in financial trouble. Some portion of the revenues of PACE would, quite obviously, be returned to individual artists and the organizations of which they are a part. As the audience grows, a greater variety and number of artists throughout the country will reach more people than they ever could alone.

PACE becomes an umbrella for the performing and cultural arts without depending upon any one group or genre for its success.

Recognizing that the aggregate arts audience is necessary for financial viability, PACE enhances the opportunity for all of the arts to share in viewer interest.

As our financial projections in *Appendix A* indicate, we believe that PACE must devote a higher percentage of its revenues to programming than any present mass entertainment pay service, and that the total programming budget would grow steadily. There are two reasons. First, the mission of PACE is nonprofit: it is designed to serve audiences, and to nurture the arts, and must use its funds to further its nonprofit mission. Second, PACE subscribers are apt to be very selective. They will not want warmed-over or second-rate product. Hence, original production will be necessary to a much greater extent than it was for the early pay television offerings because of the changes in the marketplace and the more specialized nature of this service.

As revenues grow, the mix will change. Other factors, including labor relations and negotiations with program distributors, suppliers and arts companies, will also be important considerations in determining the scale and quality of PACE's program offerings.

PACE will operate within the pay cable industry, and must be an effective competitor. Therefore, we have no doubt that program costs will be determined in a highly fluid business environment that depends upon the management skills and vision of the operator of the new network.

The Question of Stereo Sound

The low fidelity of monaural sound received by U.S. television sets has long been a concern of programmers interested in material dependent in large degree upon audio quality. Opera and symphonic music, for example, are distorted by sound coming from the typical TV set.

Public television has pioneered efforts to solve the sound problem: in the perfection of simultaneously broadcasting a stereo signal over FM radio, known as simulcasting; and in the development of the Digital Audio for Television system called DATE. With special receiving equipment, PBS stations can receive stereo signals from the satellite transmission. Sound quality is superior even to FM stereo transmissions because the digital signal suffers far less distortion and degradation than the kind of signal (analog) employed in present radio and television transmissions. The DATE stereo signal is then piped to the participating FM stereo broadcaster, who puts

out a conventional FM stereo multiplex signal for viewers to tune on their home stereo systems.

Another approach was taken in a pay cable proposal developed by Lincoln Center, premised on the belief that patrons of the performing arts, which constituted the entire programming schedule of its service, would require stereo capability before subscribing. Lincoln Center's plan was built around its own audio converter that was necessary in order to receive *any* sound on the pay channel. Once a subscriber signed up, service personnel would install the special converter, which was to be hooked up to the subscriber's stereo speakers. Such a system also required installation of special stereo receiving equipment at every participating cable system.

Today's pay cable networks have largely bypassed the stereo sound question for the time being, even though motion pictures increasingly depend upon high quality audio and musical themes. Even though PACE would have a similar interest in high quality audio, we do not believe the service would be in a position singlehandedly to pioneer such a technical advance.

Most cable operators would be disinclined to add new hardware and maintain inventories of special converters such as Lincoln Center has developed for a minority-appeal cultural service. It is possible that the inauguration of PACE might spur the existing pay networks, the cable industry, and manufacturers to upgrade new models of converters for stereo sound. In any event, PACE should pursue an interim strategy of launching the service without specialized converters.

Operating PACE

The cultural pay cable network we have described could be operated by any number of entities, both existing and newly created. We have tried to emphasize the advantages of nonprofit status for PACE: the greater emphasis on the integrity of the work, rather than profits, that is inherent in a nonprofit enterprise; the greater commonality among such an entity and the many other nonprofit organizations with which it must do business; the higher percentage of revenues that a nonprofit organization would devote to programming; the close working relationship that we believe such a service must enjoy with public television.

We believe that the purpose, principles, and operating character of the pay service that we have described would qualify it for

nonprofit, tax-exempt status with the Internal Revenue Service, since PACE would have an educational role to fulfill.[13]

The more difficult organizational questions involve the nature of the operating corporation, how it is launched and financed, who controls and manages it, and how the relationship with public television is structured.

We strongly recommend that PACE be operated by a new, independent, nonprofit corporation that is formally separated from public television, from the producers, from program suppliers, from arts companies, and from the cable industry.

PACE is a unique service. It is neither public television, nor cable television as we currently know it, nor the magazine business, nor a performing arts center, even though the concept embraces elements of each of these institutions. It will be necessary, in the first place, to build a new staff and organization from the ground up, and to attract the best people from both the public and private sectors if PACE is to be effectively and creatively managed. It would be difficult for any existing organization to free itself sufficiently of its own present priorities and demands to manage PACE in a fashion that would be required for success.

We did explore a number of alternative management arrangements: (1) one of the existing national organizations—the Public Broadcasting Service or the Corporation for Public Broadcasting; (2) one or a group of the major producing stations like WNET, KCET, WGBH, WTTW, or WETA, all of which have become quite active in recent months in exploring the terrain of the new technology; (3) a wholly-owned subsidiary of PBS or some station consortium; (4) one or more of the existing arts institutions, such as the Lincoln Center, American Film Institute, Museum of Modern Art, etc.; (5) an entity within the cable industry itself—a subsidiary of one of the existing pay networks, a multiple cable system operator, or a nonpay satellite programming service.

We do not think the operation of totally new programming services like PACE should be added to the existing responsibilities

[13]A review of the proposed service by tax counsel, Caplin & Drysdale, Washington, D.C. states, "the primary purpose and activities of the proposed Service—the promotion of the arts through the production and distribution of cultural and educational television programs—are charitable and educational within the meaning of section 501(c)(3). . . . [W]hen an organization's commercial activities contribute directly to the accomplishment of its exempt purposes, the commercial nature of the activities does not adversely affect the organization's claim to exempt status. This precedent clearly applies to the activities of the proposed Service, which would contribute directly to the accomplishment of the Service's exempt purpose of promoting the arts."

of the Public Broadcasting Service. There would be a fundamental conflict of interest in lodging this operation within an organization that must represent the consensus views of several hundred quite diverse broadcast operations. In matters of rights negotiations, programming selection, content philosophy and many other areas, PBS would be forced into direct internal conflict by adding PACE to its present operations. In addition, PBS's attention would be diverted from its principal function of serving the stations.

This is not to say that close cooperation, indeed, contractual relationships between PBS and PACE would not be necessary and mutually beneficial. For instance, in the operation of the technical center, it may well be that PACE could contract with PBS to perform the engineering tasks involved in feeding affiliate cable systems via satellite, since cost savings could be realized for both parties by sharing facilities. Many other cooperative relationships could evolve, particularly, in program negotiations and acquisitions, collective bargaining, and the like. This would not, however, require common management.

We look to the Corporation for Public Broadcasting to play an important role in helping to launch the PACE service. As the organization empowered by the Congress to "establish one or more systems of interconnection to be used for the distribution of educational television or radio programs"[14] CPB could provide a leadership role in helping to plan for the launching of PACE, as well as to lend financial and credit support to the enterprise. The Corporation itself is prohibited by law from "owning or operating any television or radio broadcast station, system or network, community antenna television system, interconnection system or facility, or any public telecommunications entity, system or network."[15]

There is ample precedent for such CPB action in its establishment of PBS in 1969, of NPR in 1970, and its major financial and technical support of the satellite distribution system for both organizations. CPB provided direct financial assistance, and served as the loan guarantor in the satellite project. We believe a CPB initiative in launching this service would be solidly grounded in authority, precedent, and the mandate from Congress to support the expansion of public telecommunications services into new technological fields.

Public television stations, especially the major producers, all have an enormous stake in the establishment of the new entity

[14]47 USC 396(g)(1)(B).
[15]USC 396(g)(3)(A).

PACE, but we don't believe that any single station or consortium of stations would be the best choice for the operation of a pay cable network. As with PBS, a conflict of interest would seem built in if a broadcaster were to operate a pay cable network.

The producing stations would, quite obviously, benefit significantly from the expansion of the production market that PACE would foster. In addition to drawing upon PACE's enlarged funding pool to support those PBS-distributed programs for co-production, public television producers would find new markets for original programs that PACE initiates. However, we believe it would be an intolerable financial burden for this new network to be institutionally tied to production centers that must, perhaps above all, keep their facilities operating at full capacity. PACE should be free to contract with independent producers, commercial entities, the performing arts centers themselves, and a wide range of suppliers. There must be an element of price competition, which is to some extent absent from the present public television programming market. This would be impossible if PACE were under the control of production entities themselves. Furthermore, as we have emphasized repeatedly, one of the most important initial tasks of the new PACE management would be the classification and negotiation of its status vis à vis the unions. Since it is neither a public broadcaster nor a commercial pay cable corporation, we believe that it must be able to work cooperatively with the unions and guilds to create a formula that permits ample compensation for labor while allowing the network to get off the ground. This would be impeded by any retroactive relationships or disputes between labor and contract signatories such as the station production centers.

The notion of a wholly-owned subsidiary of either PBS or a consortium of public television stations is inadequate as well. While it would add a corporate layer between the present institutions and the new network, we do not believe that such a structure would resolve the fundamental conflicts of interest that we have outlined.

Since the earliest days of pay television, the Lincoln Center for the Performing Arts has explored the possibility of launching its own subsidiary nonprofit network to extend the reach of its own resident companies. HBO, in fact, had negotiated for inclusion of Lincoln Center programming in its formative years. For various reasons, Lincoln Center itself has been unable or unwilling to take the step into pay television. Other arts institutions have also begun exploring the idea of extending their reach by use of cable and other new technologies. We do not believe that any single entity in the arts

community would provide a large enough base to underwrite the substantial costs of producing top quality arts programming. Furthermore, some organizations are apt to view the pay cable service as a money-making venture to help meet their own deficits. While this is a worthwhile objective, it might not necessarily result in the best product. Compensation for the talent, labor, and the participating entities is a natural part of any program budget. But to use PACE primarily as a revenue generating arm of an existing institution—nonprofit or profit—seems at odds with our idea of a first-rate arts program service.

While the cable television industry itself is comprised of many profit making companies, a nonprofit sector has begun to develop with the creation of such groups as the Cable Satellite Public Affairs Network (C-SPAN), the Appalachian Regional Commission's public service network, and others. None thus far has been principally concerned with arts and cultural fare. The profit making cable corporations, however, are currently unwilling to invest their capital in such a venture, especially since they face the enormous job of building major urban systems during the 1980s. While some individual cable operators and multiple system owners are exploring the possibility of small scale arts oriented program ventures, the scale of the PACE network appears to be beyond the interests of any of the profit making cable companies currently in the business.

The institution whose structure and relationship to public television most parallels PACE is the Children's Television Workshop. Launched by Joan Ganz Cooney, a public television producer, CTW was incorporated as a nonprofit institution and is governed by a board that was selected because of the members' skills in assisting the company in directing the new enterprise. The Workshop has always had a close relationship with public television, even though structurally it is not a licensee, nor a member of PBS, nor under the direct governance of public television executives. Not only do CTW-produced programs immeasurably enhance the PBS schedule, but CTW's related business and revenue-generating activities enable considerable investment in the development and production of programs like "Sesame Street" and "The Electric Company."[16]

In similar fashion, PACE would utilize the revenue-generating pay cable network activity to increase the supply of its own and

[16]According to its ten-year corporate review, CTW increased its own contributions to public television programming from $1.9 million in 1975 to $5.4 million in 1979. In 1975, CTW contributed only 5 percent of the budgets of "Sesame Street," and "The Electric Company." By 1979, that figure had been raised to more than 50 percent of the programs' production budgets.

public television's programming, and to reduce the costs for some programming shared with the broadcast system.

The governance of PACE, like CTW's, must be independent and capable of guiding the institution toward its own legitimate creative and business goals. We suggest that the actual selection and composition of that board be accomplished in much the same way as was CTW's. The individuals who launch PACE by incorporating it and establishing its charter would, in cooperation with the principal funders and supporters, construct a board that could serve the needs of PACE. While there might be some overlap with specific individuals within public television, we think this should occur only by coincidence, not by design. There should be no *ex officio* or mandated interlocking boards. Nor should there be official government appointment or involvement. CTW's creation for the production of "Sesame Street" was heavily dependent upon U.S. Office of Education funding. Yet no Presidential or agency involvement with that grantee's governance was required or appropriate.

We believe CPB, PBS, and several major foundations should be approached for initial financial and moral support. We do not propose here to design a fundraising strategy that could predict such matters. Our only point is to underline the absolute necessity for this institution's own integrity, independence, and private freedom of action.

As to the question of whether a nonprofit organization can reasonably engage in revenue-generating activity, we again return to the CTW experience. One top CTW official explains: "As long as the generation of income is a means of promoting the organization's social aims rather than an end in itself, it is an entirely appropriate activity for a nonprofit institution."[17]

Public Television, PACE and the Commercial Market

This proposal is based upon a strong central conviction: that a noncommercial role will be as essential in the new television delivery systems and programming configurations as it has been in the broadcasting industry. The essence of a tax-exempt, nonprofit enterprise is devotion to its educational, charitable, or social goal, rather than to the accumulation of profits for their own sake. By definition, the nonprofit entity must reinvest its revenues in the principal ac-

[17]Paul B. Firstenberg, "Profit-Minded Management in the Nonprofit World," in *Management Review*, July, 1979, p. 12.

tivity for which the organization was established. This is not necessarily the case for profit-making enterprises, regardless of the quality of the company's output. Unless a company enters a business for what amounts to a nonprofit purpose—the enhancement of its role in the community, or as a tax write-off—private enterprise must at some point funnel its surplus revenues, i.e., profits, to stockholders or the proprietors of the business. Because of this fundamental distinction, we believe that an arts and culture channel in the cable market should be run by a nonprofit enterprise that can continue to reinvest its revenues in programming that will benefit its viewers and the artists responsible for the work.

We believe the advantages of cooperation between the new PACE network and public television should be evident from the foregoing analysis.

By tapping what we calculate to be a growing cable audience that is willing to pay for specialized programming fare, PACE will generate a wholly new source of revenue to finance program acquisition and production. By helping to create PACE, public television would gain the benefits of this new programming finance pool. PACE could bring new programs to public television audiences, as well as help lower costs for certain of public television's own programs. As the revenue grows, television programming in the cultural and arts field could become substantially subsidized by PACE, enabling other less fundable types of programs to become financed by existing public television sources.

By helping to launch PACE, public television fulfills the mandate of virtually every observer who has surveyed the industry in recent years. Congressional committees, FCC officials, figures in the Administration like Henry Geller of the Department of Commerce, and the Carnegie Commission have all urged public television to join in the development and utilization of new delivery technologies.

Indeed, an increasing chorus of voices has been heard in the past year from inside public television, echoing the challenge to take advantage of new opportunities, rather than to view the changing marketplace only as a threat to the status quo.

PACE offers an important opportunity to accomplish these goals, while maintaining a nonprofit mission within the broad mandate public television has pursued since its inception. PACE focuses on program production, which is the area in which public television needs the greatest financial support.

Underlying this plan for pay cable is the changing marketplace for television programming. PBS broadcast service as we know it today will take its place on a television dial filled with several dozen alternative sources of entertainment and information, as more and more programmers turn to cable as their main video pathway into the home. Other systems will accompany that move, but the net result must be an alteration, not a diminution of the character and potential of public television as a viewing alternative. PACE can be the advance guard against that eventuality, as well as an extraordinary new service in its own right.

There will be critics of our proposal, both within and outside the public television system. Many will hold that a nonprofit, educational institution like public television should not enter a marketplace such as pay cable. We strongly disagree. As long as the core of the enterprise advances the central objective of public television—the provision of high quality educational and cultural programming—it does not matter that people are paying directly for the service being offered.

A long history of such activity in the nonprofit world can be cited. We have discussed the unique role of the Children's Television Workshop in the television industry. Other cultural groups that earn revenues in the open market include museums, theatrical and performing arts companies, universities, scholarly presses, nonprofit magazines, and research institutions.

The university press is an institution that offers considerable parallels to the PACE concept, which is, in effect, "video publishing." Academic publishing combines the prestige of fostering high quality work that may not be highly profitable with the need to market books. Those presses use advanced entrepreneurial methods to present their wares to consumers who could purchase other books by other publishers. All books are purchased in the same (usually profit making) bookstore regardless of the nature of the publishing entity. Similarly, all the new cable services will arrive in the home via a commercial entity, regardless of the program's source.[18]

The often discussed dilemma for nonprofit organizations like public television is this difficulty in generating new sources of revenue because of dependence upon fixed, external, and often earmarked sources of funds. The remedy is usually an additional sub-

[18]For an analysis of this subject see Irving Louis Horowitz, "The Tripartite World of the University Press," a speech reprinted in the *Chronicle of Higher Education*, January 7, 1980, p. 80.

sidy, which increases the dependence of the institution on the government, private charities, and others who do not actually operate the institution.

We believe that PACE will not suffer from this dilemma. The "revolution" in consumer-financed television now permits a growing number of new services to become self-sufficient. An arts channel would not depend upon continuing government or other subsidy for its survival; indeed, with adequate seed money, the service would generate new funds. This is a very significant development in the noncommercial television industry, which remains financially dependent upon too many outsiders.

Some will criticize the basic idea that a service should be marketed to meet the tastes of an elite group of consumers. The criticism has been often leveled at public television as well, because it too often highlights "high culture" in order to attract those viewers most likely to donate to the stations.

The PACE concept accepts the argument about elitism, but takes advantage of it. There is no question that PACE would be programmed for an elite with specialized tastes. We believe that a certain type of program and a certain type of consumer could be matched via the new PACE service in a fashion that would generate much new programming and increase the diversity on the television dial.

This elite can finance new program production, and, as we propose, some of that product can then be distributed at a lower cost to public television. The dividend from this marketplace activity, however, is a healthier, richer financial base for the service that is available to public television audiences without mandatory charge over the air.

From our point of view, this would be an important step in helping to relieve public television from the necessity of programming so heavily for that elite audience. It would spend greater portions of its funds and energy for other, less wealthy portions of the audience, without sacrificing the kinds of programs that may attract the "upscale" viewers.

The most compelling reason for this partnership has to do with public television's fundamental mission: it came into being to satisfy a void in the marketplace that commercial television had abandoned. PACE must come into being as a noncommercial cable service—perhaps only one of many—but a significant and influential new element in the industry. There is no reason why this critically im-

portant sector of American communications should be left exclusively to those whose paramount concern is return on investment. Had that been the case in earlier decades, public television would not have been created and would not be in the position it has earned today: a viable, important, and impressive part of the overall mix of media services that Americans use in their daily lives.

PART II

Industry Reports

CHAPTER THREE

Domestic Satellite Communications

Overview

The rapid development of domestic communications satellite systems is stimulating major change in the design and delivery of services in business, entertainment, health, education, and public safety. Domestic satellites have spawned a new aspect of the common carrier communications business—the leasing of satellite capacity. They have begun radically to alter the economics of information distribution and, in doing so, have spurred innovative communications services and increased competition. Publishers, news-gathering organizations, cable television companies, broadcasters and television networks are already using satellites or planning for such use. Established communications carriers such as the telephone companies and the postal service are increasing their involvement in the satellite field. Xerox, IBM, Time Inc., and other major corporations have initiated new communications ventures that depend substantially on the advantages of satellite distribution.

In only a short time, those advantages have become evident. Put simply, satellites provide a broadband, low cost, distance insensitive means of distributing information. They provide the same information-conveying capacity as terrestrial systems at a reduced capital investment and lower use costs. Satellites also have clear advantages over terrestrial systems when the object is to provide communications to mobile facilities or to many fixed facilities whose location is not necessarily known. There is little that most present terrestrial transmission systems can do that satellites cannot do more cheaply and quickly and with equal or better quality and reliability.

Examples of these benefits and advantages abound. The annual rental charge for an international voice satellite link was $32,000 in

1985; in 1979 the charge was $5,760 (in 1979 dollars). In 1974, only a handful of cable television systems were tied together via terrestrial microwave. Five years later, over 2,000 systems were part of a satellite interconnected network.

A decade ago the domestic satellite field was considered a high risk arena. Entry costs were high, demand for satellite service was largely unknown, and, despite the experience of INTELSAT, the international satellite consortium, and the NASA ATS and CTS satellites, the technology remained suspect. Now, the quality and reliability of satellite technology has been established, in spite of a number of outages and the well-publicized apparent loss of an RCA satellite in late 1979.

Projections for the domestic satellite business are rosy. U.S. operators had revenues of about $100 million in 1978. Some analysts see a $2 billion business by the mid-1980s. Demand for satellite service is no longer an unknown. In the last year, domestic satellite supply and demand curves crossed, and virtually all future projections are for healthy increases in the need for voice, data, and video circuits.

In the offing are significant advances: a new generation of larger, higher power, more sophisticated satellites; the space shuttle; and direct satellite-to-home broadcasting. The current period can best be seen as a time of transition to a new era, when satellites become the basic infrastructure of both domestic and world-wide communications.

The changes being set in motion by domestic satellites most directly affect businesses that provide long-haul communications services—principally the common carriers and resale and specialized carriers. For users of satellite service like public television, the changes are less direct, but potentially no less significant. However, the opportunities and ventures discussed throughout this study cannot be fully appreciated without an understanding of this evolving domestic communications satellite environment.

THE CURRENT DOMESTIC SATELLITE FIELD

Early Development

Although communications satellites were tested in the 1950s and early 1960s, satellite communication, as we know it today, began in

1963 with the launch of Syncom II, the first satellite in "geostationary" orbit—its speed synchronized with the earth's rotation.

Domestic nongovernmental satellite service began in 1973 when RCA Global Communications leased capacity on a Canadian ANIK satellite to provide communications services between Alaska and the West Coast. As early as the mid-sixties, private firms sought Federal Communications Commission authority to operate domestic satellites, but it was not until 1972 that the Commission instituted its "open skies" policy permitting any qualified applicant to own and operate satellites in a competitive environment. In the next six years half a dozen domestic satellites were placed in orbit, beginning with Western Union's Westar I in April 1974.

Under the FCC's satellite policy, would-be operators must obtain satellite procurement and launch authority from the Commission. It must approve the proposed orbital location of the satellite as well as the radio frequencies to be used. (Up to now orbital slots have been granted on a first come, first served basis.) The Commission must also authorize the types of service to be offered and the carriers must file tariffs for all planned customer services. Satellite operators can be authorized to provide either point-to-point communications services, point-to-multipoint services or both. *Point-to-point services* include message telephone for the general public and private line services such as voice, data, facsimile, and video. In a *point-to-multipoint service* the information or message is transmitted from one earth station to the satellite for reception and use by two or more users. The transmission of pay TV programming to cable systems is an example. All current domestic satellite operations are in what is known as the *fixed satellite service*. Satellites in this category broadcast to known, fixed locations. Satellites in the *broadcast satellite service*, on the other hand, would provide service to a much larger number of receiving points such as homes. Comsat's proposed pay TV direct broadcast satellite (DBS) service is an example. In actuality, the distinction between fixed and broadcast service may not be as sharp as the terms suggest. Nevertheless, the regulatory distinction does exist.

Although all satellite services are tariffed, satellite carriers are able to offer customers a variety of service arrangements. Generally there are two broad categories: occasional service and fixed term service. Under occasional service a customer may seek as little as one half-hour of satellite time to distribute, for example, a special television program. Some regular customers use occasional service when special circumstances warrant it. In 1979, for example, PBS

used approximately 1000 hours of occasional service even though it has full time use of three Western Union transponders.[1] Some customers also commit to a certain number of occasional hours each year and thus receive a lower rate. Fixed services could range from a commitment of, say, five hours a day, up to full-time use of several transponders.

In addition, for different rates, customers can purchase service that is either preemptible or nonpreemptible and either protected or unprotected. A customer paying for protection would be assured of service even in the case of a transponder outage. The carrier would be required to shift the customer to another of its transponders, or even a transponder on a competitor's satellite if necessary. As the term suggests, a customer who contracted for preemptible service might have service temporarily interrupted if the carrier needed the transponder for a higher priority transmission.

Service arrangements have changed since the initiation of satellite service and are likely to continue to be modified in response to market conditions.

Satellite Carriers

Throughout the 1970s domestic satellite operations grew steadily. By early 1980 three domestic systems—comprising eight satellites—were being used by a range of commercial and noncommercial organizations to distribute video, voice, facsimile, and data communications.

Today, the satellite common carrier field is dominated by Western Union, RCA Americom, and Comsat/AT&T. (Actually, because of the special nature of the AT&T/Comsat operation, discussed later, the field has been controlled over the past five years by Western Union and RCA). Western Union operates the three-satellite Westar System and is planning to launch two additional satellites. RCA operates two Satcom satellites. The firm suffered an important setback when Satcom III was lost in space shortly after launch in late 1979. RCA plans to launch two additional satellites and in the meantime has leased capacity from AT&T to accommodate existing customers. The Comsat/AT&T Comstar system con-

[1]A transponder is the part of a satellite which receives a transmission from the earth and then broadcasts it back on a different frequency. Generally, one transponder can handle one video signal and several audio signals, or some combination of video, audio, or data.

sists of three satellites. (Table 3-A lists operating and planned satellites).

However, over the next two years as many as three new carriers may enter the satellite field. Hughes Aircraft has proposed launching two satellites for services that appear to be directly competitive with Western Union and RCA services. Satellite Business Systems (SBS), a partnership of subsidiaries of Comsat, Aetna Life and Casualty, and International Business Machine, plans to operate three all-digital satellites to provide voice, data and teleconferencing services to businesses and government agencies with large volume communications requirements. Southern Pacific Communications, a specialized common carrier, has announced that it will seek authority to operate two satellites. AT&T, freed from an FCC moratorium barring the firm from offering non-governmental private line satellite service, is planning to use Comstar satellites to provide additional communications services.[2] AT&T plans to launch a fourth Comstar satellite and, beginning in 1984, the company intends to replace the Comstar system with a new generation of satellites.

The domestic satellite business has also led to the creation of a variety of resale carriers and satellite brokers or syndicators. Basically, these firms act as middlemen between the satellite wholesaler and the satellite user. Resale carriers contract for bulk satellite time and then resell this time to users whose requirements are limited,

[2]The Comstar system was financed and is owned by the Communications Satellite Corp. (Comsat), but the satellites are leased to American Telephone & Telegraph (AT&T). The reason for this arrangement is historical.

The Communications Satellite Act of 1962 authorizing creation of Comsat did not deal with Comsat's role in domestic satellites. When the FCC authorized multiple entry into the satellite field, it permitted Comsat to be eligible. However, the Commission required Comsat to form a separate subsidiary to engage in domestic satellite communications.

At the same time the FCC placed a moratorium on AT&T involvement in the satellite field in order to encourage competition. But AT&T was permitted to use the Comstar system to provide telephone service to the general public and government and private line service for the government.

As a result, Comsat General leases each Comstar satellite to AT&T for about $1.3 million per month per satellite. AT&T in turn shares a portion of the system with General Telephone and Electronics (GTE) and also leases some capacity to the international record carriers to provide television and private line services in Puerto Rico and Hawaii. The FCC did permit AT&T and GTE to own and operate earth stations used in connection with the Comstar system.

In July 1979 the FCC lifted its three year ban on AT&T offering nongovernmental private line services via domestic satellite. Thus, AT&T (or GTE), subject to specific FCC approval, is now free to use the Comstar satellites to provide additional services.

Table 3-A

OPERATING AND PLANNED DOMESTIC COMMUNICATIONS SATELLITES

SATELLITE	LAUNCH DATE/LOC.	# OF TRANSPONDERS/ BANDWIDTH	FREQUENCIES	DESIGN LIFE	USE
Westar I	4/74 / 99°W	12 (36 MHz)	4/6 GHz	7 years	Private line, voice, data
Westar II	10/74 / 123.5°W	12 (36 MHz)	4/6 GHz	7 years	Video
Satcom I	12/75 / 135°W	24 (34 MHz)	4/6 GHz	8 years	Video 20 Data 2
Satcom II	3/76 / 119°W	24 (34 MHz)	4/6 GHz	8 years	Video, voice, Alaska service
Comstar I	5/76 / 128°W	24 (34 MHz)	4/6 GHz	7 years	Voice
Comstar II	7/76 / 95°W	24 (34 MHz)	4/6 GHz	7 years	11 transponders leased to RCA
Comstar III	7/78 / 87°W	24 (34 MHz)	4/6 GHz	7 years	In-flight space
Westar III	8/79 / 91°W	12 (36 MHz)	4/6 GHz	8 years	Voice, video data, facsimile
SBS (3)	Summer 80	8 (54 MHz)	12/14 GHz		Digital voice, data, video
Satcom III	June 81	24 (34 MHz)	4/6 GHz	10 years	N/A
Satcom IV	Fall 81	24	4/6 GHz	10 years	N/A
Westar IV	January 82	24	4/6 GHz	10 years	N/A
Advanced Westar	1981-82	12 C-Band (36 MHz) 4 Ku-Band (225 MHz)	4/6 GHz 12/14 GHz	10 years	Voice, video, facsimile, data
Hughes (2)	1981	24 (36 MHz)	4/6 GHz	10 years	N/A
Southern Pacific (2)	N/A	48	4/6 GHz 12/14 GHz	N/A	Voice, data, video
AT&T	1983	N/A	N/A	N/A	N/A
Comsat DBS	N/A	N/A	12/14 GHz	N/A	Pay TV

sporadic, or specialized. Resale carriers must file tariffs at the FCC and are considered to be providers of communications services. Satellite syndicators or brokers, on the other hand, do more than just provide satellite time. Hughes Television and the Robert Wold Co., for example, may perform a variety of functions involved in setting up an ad hoc video network or arranging for a teleconference. In fact, the line between brokers and resale carriers is sometimes blurry. Firms like Wold and Satellite Syndicated Systems can act as both. Some of the services they provide are tariffed, while others are not.

Satellite Capacity: The Supply and Demand Question

One of the central characteristics of the present domestic satellite environment is a changing supply and demand picture. As we have noted, in the domestic satellite industry's early years the availability of satellite transponders for lease far exceeded demand. Now, however, the prospect is for increased demand and limited capacity, at least over the short term. In time the second generation Advanced Westar and SBS satellites may resolve the supply problem. But for the time being limitations on satellite capacity have begun to affect the business strategies of satellite users and operators and have also raised questions about the FCC's basic satellite policies. To appreciate this capacity problem it is necessary to look more closely at the technical and regulatory framework of domestic satellite operations.

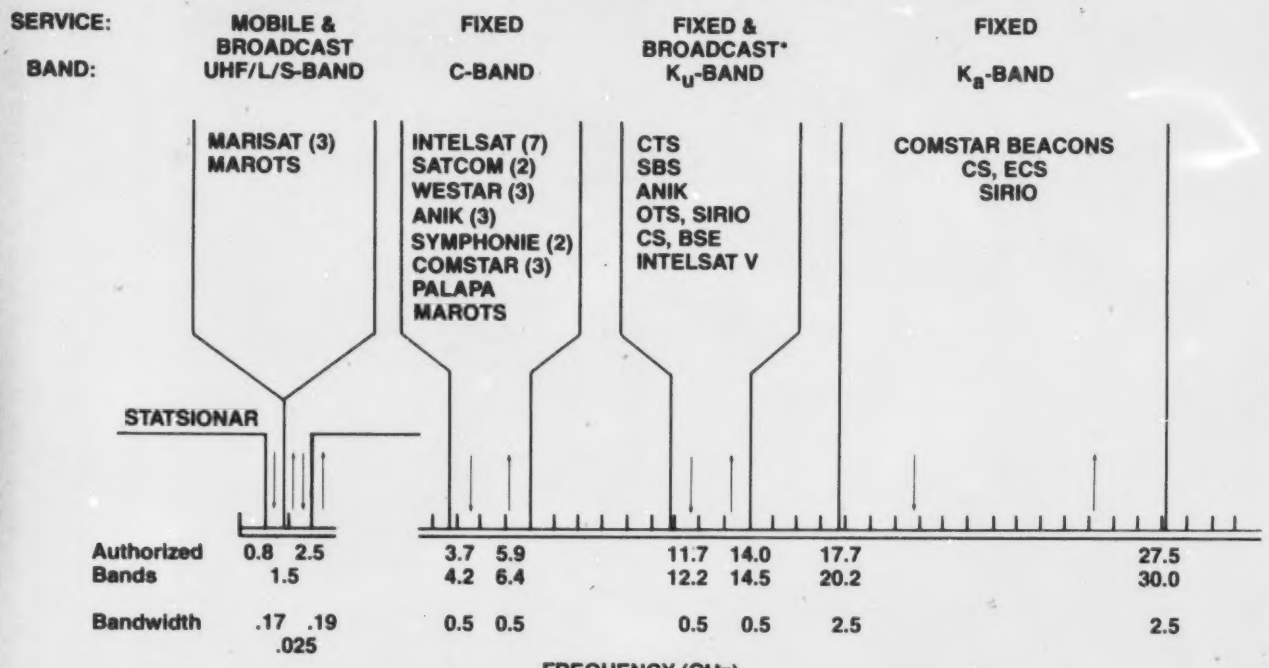
Under international law radio frequencies used in satellite broadcasting are allocated on a regional or hemispheric basis.[3] In the Western Hemisphere, the three principal frequency bands available for commercial use that must be shared with other nations on a noninterference basis are C band (4/6GHz), Ku band (12/14GHz), and Ka band (20/30GHz). Part of each is allocated to earth/satellite communication and part to satellite/earth communication. (See Table 3-B.) At the present time broadcast satellites are only authorized on the Ku band.

Each band has a certain amount of frequency. C band, for example, has only 500 MHz for satellite operations, while Ka band with 2500 MHz can accommodate many more satellites. In some

[3]Frequencies used for satellite service are either dedicated solely to satellite operations or shared between satellite and terrestrial services. Satellite frequency bands are further divided among fixed satellite services, broadcast satellite services, or services shared between the two. (There are also allocations for other services such as mobile, maritime, aeronautical, etc.)

Table 3-B

COMMUNICATIONS SATELLITE FREQUENCY ALLOCATIONS



Based upon chart published by NASA

*Bandwidth increased to 1000 MHz per 1979 GWARC

cases, such as C band, the bands are shared with terrestrial service. Finally, each of the three bands has different properties that make them more or less suitable for broadcasting. The lower bands are subject to less natural interference and thus satellites can operate at lower power. But lower power satellites require larger earth terminal antennas. Higher bands are subject to more natural interference—from rain, for example—and require higher power; on the other hand, smaller earth antennas can be used. All of these factors have affected the use of frequencies for domestic satellite operations. In the U.S. the C band was the first to be used even though under present technology it can handle fewer satellites. Ku band is just starting to be developed, and Ka band exploitation is still some years away.

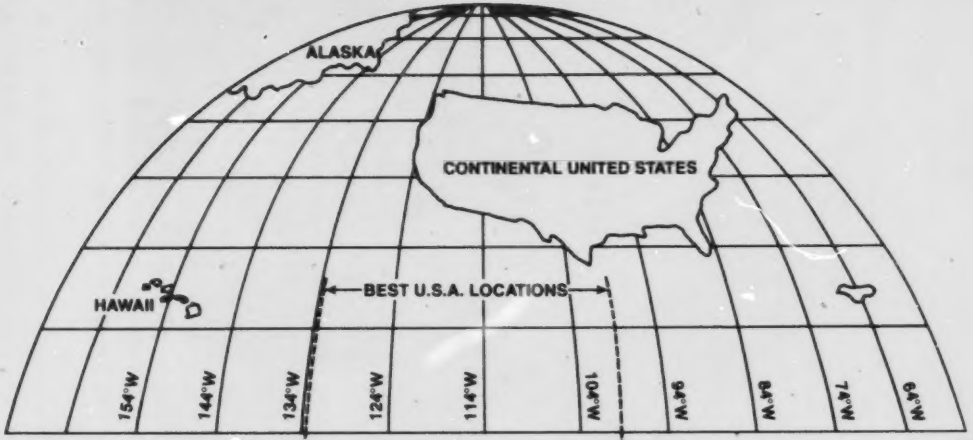
Communications satellites are almost always located in the geostationary orbit 22,300 miles in space. Around the world there are eighty operating satellites in that orbit. Sixty-four handle domestic, international and military communications; the rest perform scientific, meteorological or experimental functions.[4] In this orbit they are able to "view" or place a signal over the desired reception area at all times. If they were not so located, as was the case with the earliest communications satellites, then communication between earth and satellite would only be possible at certain times during the orbit. The position within the geostationary orbit is also vital. In order to view the entire U.S., a satellite must be located within a 40° arc of the geostationary orbit. At the extremities of that arc, problems begin to occur. For example, it might not be possible to place a strong enough signal over the extreme portions of the country like Hawaii and Alaska. In addition, in order to avoid interference between satellites using the same frequencies, they must be positioned 3°–4° (or 200–270 miles) apart. Thus, there are only a limited number of slots in the geostationary orbit suitable for broadcasting in a certain frequency band. (See Table 3-C.) According to NASA there are only 7 optimal orbital slots in C band, and already 13 positions are either used or reserved. All are Canadian or U.S. satellites. Thus, under present technology, C band is virtually saturated. Adequate space is still available in the Ku and Ka bands, but over the short term there will be scarcity.

Contrasted with this scarcity are projections of the need for satellite capacity and service. Such projections may not be totally reliable since it is difficult to determine how much domestic and international business satellite operators would capture from terres-

[4]*The New York Times*, March 24, 1980, p. D1.

Table 3-C

COMMUNICATIONS USAGE OF THE GEOSYNCHRONOUS ORBIT



		BEST U.S. SLOTS	SLOTS FILLED OR PLANNED
C-BAND	RCA, RCA, COMSTAR, WU, RCA, ANIK, ANIK, ANIK, WU, COMSTAR, WU, COMSTAR, HUGHES	7	13
Ku-BAND	SBS-A, CTS, ANIK, SBS, WU, TDRSS	4-8	6
Ka-BAND		24	0

Based upon chart published by NASA

trial carriers even if capacity were available. Nevertheless, even allowing for this factor, the magnitude of the projected needs is impressive.

Current C band capacity amounts to about 150 transponders. Based upon studies done for it by ITT and Western Union, NASA foresees a need for 2000 transponders by the late 1990s. ITT projected a need for nearly 700 transponders by 1990, Western Union over 800, or double the existing and planned C band capacity. (See Table 3-D.) Most observers believe that C band will be fully used within the next year or two. SBS has predicted that both of its Ku band satellites will be fully utilized in 1986, and several projections anticipate saturation of the Ku band by the mid- to late-1980s.

As we discuss later in this chapter, both technical developments and regulatory actions could help resolve these expected shortages. But over the short term the demand for satellite capacity—particularly for the delivery of video entertainment services —will outpace supply.

Satellite Ground Environment

In the early days of domestic satellite communication most satellite operators viewed the business in conventional common carrier terms. That is, in addition to providing space segment communications, carriers would also establish an extensive network of high capacity transmit/receive ground stations to provide customers with origination and reception services. Typically, these earth facilities were located near major population centers, employed large antennas—15 to 30 meters in diameter—and were used to relay point-to-point communications.

However, these facilities were expensive to install, operate, and maintain, and therefore greatly increased the cost of the satellite business at a time when demand for its services was not high. These costs plus the frequency congestion problems in major cities, tended to limit the number of earth terminals a carrier could put in place. Although carriers continue to establish transmit/receive facilities, one result of this congestion /cost problem has been a rapid increase in the number of earth station-sharing arrangements between carriers and customers. For example, Western Union has received FCC permission to implement earth station-sharing arrangements with public broadcasting. Western Union will provide transmit and receive services from the PBS Main Operations Terminal (MOT) outside Washington, D.C. and receive services at public broadcast-

Table 3-D
Projected Transponder Demand

	1980	1990	2000
ITT			
Voice	21	225	474
Data	5	355	436
Video	35	110	211
Total	61	690	1121
Western Union			
Voice	346	630	1862
Data	6	42	201
Video	80	157	258
Total	432	829	2321

Source: "Future Demand For Domestic Satellite Capacity," Walter Hinchman Associates, Inc., prepared for Hughes Aircraft, Inc., 1979.

ing sites in New Orleans and Houston.[5] Western Union will also seek sharing arrangements with public broadcasters in an additional 22 large and medium sized cities. It plans to install and operate facilities at public broadcasting terminals for video services, but in some sites it also envisions including message type communications.

Initially, however, the emphasis was on carrier owned and operated earth facilities. Then, in the mid-1970s two actions paved the way for what is now one of the most significant developments in the domestic satellite area—proliferation of low cost private receive-only earth stations used for fixed satellite services, particularly for point/multipoint communications.

First, in 1975 Home Box Office switched from microwave to satellite distribution of its pay television programming. HBO's first satellite transmissions in September 1975 were received by earth stations equipped with 10 meter antennas at cable systems in Jackson, Mississippi, and Vero Beach, Florida. The implications of this successful venture prompted widespread interest within the cable industry in owning satellite receive facilities.

[5]In return for the right to use public television earth terminals, Western Union will credit CPB with a set-off against Westar transponder lease charges. The funds saved by this arrangement will be divided between CPB and participating stations.

Then, more importantly, in December 1976 the FCC ruled that it would routinely approve applications for earth stations using antennas 4.5 meters in diameter or larger. Prior to this ruling the Commission did not actually prohibit use of small antenna earth stations, but it did issue guidelines suggesting that the antenna should be at least 9 meters.

Prior to 1977 virtually all receive-only earth stations had 10 meter antennas and cost $100,000–$150,000. After the FCC's ruling, applications for 6 meter, 4.5 meter and even smaller antennas mushroomed. And the cost of small receive-only earth stations began to drop dramatically. During 1977 earth station construction costs generally ranged from $25,000 to $70,000.

By mid-1979 a growing number of earth station manufacturers were offering earth stations for $10,000 to $15,000, with some actually going below $10,000.

In October 1979 the FCC gave small earth stations another boost when it voted to deregulate receive-only terminals. Previously the FCC has required a three-step process in order for an earth station to become operational: frequency coordination or clearance; construction permit; and licensing.

Frequency coordination was required because earth stations sometimes receive interference from terrestrial microwave services in the 4GHz band. The required coordination often cost as much as $2,000 to $3,000 per earth station.

Under the new regulations a potential earth station owner may decide whether or not to be licensed. If he does not seek a license, then he is free to locate the earth station wherever he chooses. However, without a license, the owner has no recourse if his terminal is subject to interference.

For those who wish to obtain a license, the process has been streamlined: no requirement for a construction permit, and greatly reduced paper work. Licensed earth stations do receive frequency protection. The FCC also increased the license period from three years to five.

Although all of the ramifications of earth station deregulation are not clear, it is likely that the action will have its biggest impact on satellite audio services and on earth station operations in rural and semi-rural areas where interference is less of a problem.

At the end of 1979, an estimated 2,500 domestic satellite earth stations were in operation. Within another few years that number could double again as new satellite services are initiated. Over the

short-term the biggest growth areas appear to be cable television systems, radio stations, hotels, motels, and condominiums.

Over a dozen domestic firms are currently manufacturing and installing earth stations. Nearly 1,200 earth stations were sold in 1979, a 53 percent increase over 1978 sales. Based on 1978 and 1979 figures, the great bulk of the sales are for small (five meter or less) earth stations.

According to Goldman Sachs, a New York investment firm, the domestic earth station market will rise from $58 million in 1978 to $190 million in 1982, and the worldwide market will rise from $372 million to $636 million over that period.[6]

The rapid development of the small earth station market and the deregulation of earth stations has also led to interest in marketing earth terminals directly to consumers. Several earth terminal manufacturers are attempting to sell small earth stations directly to homeowners in rural areas at prices ranging from $10,000 to $35,000. It is unlikely that the home satellite terminal market will amount to much more than a specialty business—at least until DBS satellites become commonplace—but already home reception of satellite signals has begun to raise legal and copyright issues and has prompted greater interest in scrambling satellite transmissions.

INTERNATIONAL SATELLITE OPERATIONS

International satellite operations are growing steadily through the International Telecommunications Satellite Organization and through the development of foreign domestic systems. These advances are beginning to have an important impact on U.S. domestic operations in both the technical and service areas. An expanding international satellite business also creates new hardware and software markets or enlarges existing ones.

INTELSAT, a 102-nation consortium, owns, maintains, and operates the global satellite system used by countries for public international telecommunications services.[7] The INTELSAT space segment consists of 12 proprietary satellites. Seven serve the Atlantic Ocean region, three the Indian Ocean region, and two the Pacific

[6]"Data flow demand spark earth station market," *Electronic Business*, December, 1979.

[7]Each member country holds an investment share of INTELSAT based upon that country's use of the system (with a minimum share of 0.05 percent). System revenues are derived from utilization charges and, after deduction of operating costs, are distributed to members in proportion to their investment share as compensation for use of capital.

Ocean region. The satellites are either INTELSAT IV or INTELSAT IV-A birds with a capacity of either 4000 voice circuits and 2 television channels or 6000 voice circuits and 2 television channels. The ground segment, consisting of earth stations owned by entities within countries, includes 249 antennas at 203 sites in 97 countries. All earth stations' antennas are either 30 meter, 11 meter, or 14 meter, the latter to be used with new Ku band INTELSAT satellites.

INTELSAT recently ordered 8 advanced INTELSAT V satellites. These are representative of the kind of satellite which will be common in the 1980s. They operate in both the C and Ku band simultaneously and re-use frequencies through both beam isolation and polarization isolation. Each INTELSAT V will have a capacity of 12,000 two-way voice circuits plus 2 TV channels.

Over 80 percent of the utilization of INTELSAT is for 4 KHz voice and data circuits. However, demand for satellite time to relay television signals has grown steadily in the last 4 years and in 1978 increased 53 percent to 16,000 hours. The great bulk of INTELSAT utilization is concentrated on the 7 Atlantic Ocean regional satellites.

In addition to the domestic satellite systems operated by the U.S., Canada, Japan and others, use of the INTELSAT system for domestic operations is growing. Sixteen countries—among them Brazil, France, Norway, Peru and Spain—now use INTELSAT domestically and 3 additional countries plan such use. Previously INTELSAT only leased transponders for domestic use on a long-term basis. However, under revised policies INTELSAT leases transponders for as little as 3 months at a cost of $450,000. Domestic use of the INTELSAT system might be expected to increase in the future given the increased capacity and geographical isolation and sophistication of the INTELSAT V satellites. This growing worldwide satellite structure offers great potential for increasing the flow of information, live news and sports coverage, and exchange of television programming.[8]

A second key activity in the international field is the development of direct broadcast satellites. Although a number of nations have interest in DBS systems, it is Canada and Japan (and to a lesser extent the United States and several Western European countries) that appear to be closest to DBS operations.

[8]The FCC recently authorized Comsat to provide international television transmissions directly to both individual carriers and individual users. By allowing Comsat and the international carriers to compete in this area and authorizing service directly to users, the cost of such services could drop. *In the Matter of the Application of Communications Satellite Corporation*, FCC 80-42, File No. I-P-C-50 (Feb. 21, 1980).

Japan launched a 3 year DBS experiment in March, 1978 to test delivery of NHK programming to rural areas and special educational programming. The satellite broadcasts in the 12/14 GHz band and its transmissions are received by experimental 2, 2.5, and 3 foot antennas. Japan plans to launch a second satellite in 1980 and there are reports that the country is ready to commit to a full scale DBS program by early 1981. The second satellite, BSE-2, will operate five 180 MHz transponders in the Ku band. Japan has already established a Satellite Television Corp., involving the NHK, Nippon Telephone & Telegraph, and KDD, Japan's international carrier, to operate direct broadcast satellites.

In September 1979 Canada began direct broadcast satellite tests that will continue through mid-1980. The Canadian Department of Communications (DOC) has leased 4 transponders on the ANIK B satellite launched in 1978, which operates in both the C and Ku bands. The receivers used in the test are 1.2 and 1.8 meter dishes manufactured at a unit cost of $3,600 (plus $200 installation). They are projected to be mass produced for approximately $300.

The first tests involved transmission of TV Ontario (an educational TV network) programs to 50–100 homes and institutions in the Ontario area. About 50 terminals are also being installed in British Columbia homes, CATV systems, and other locations for distribution of CBC programming. In addition to the DOC and TV Ontario, the Ontario Ministries of Transportation, Culture, and Recreation are supporting the project.

In a potentially significant development, the governments of Germany and France recently concluded an agreement to cooperate in development of DBS satellites. Each country would have its own satellite but would share a space platform and payloads for satellites that would be fully operational by 1985. Although most details are not worked out, the German-French agreement provides for two pre-operational DBS satellites to be launched in 1983. Each satellite would have 3 TV channels. West Germany has plans to provide 2 TV network services and a radio service. It aims to sell three foot home receivers for approximately $830 per unit.

Another important development in the international sphere is the European Space Agency's new satellite launching capability. Through ESA, 9 European countries led by France have developed a three-stage Ariane rocket able to compete with American made rockets and NASA launch capability. Although Ariane is limited to much smaller payloads than the manned, reusable space shuttle, the ESA rocket does compare favo[illegible]ly with the conventional Thor

Delta and Atlas Centaur rockets. ESA also claims that the $25–30 million per launch charge for Ariane makes it competitive with the Space Shuttle. The significance of Ariane is that beginning in 1981, when Ariane becomes operational, competition between ESA and NASA could result in lower charges for launching communications satellites. Western Union and AT&T have already reserved launches with ESA.

TRENDS AND DEVELOPMENTS IN SATELLITE COMMUNICATIONS

Regulatory Developments and Issues

Perhaps more than in any other area of telecommunications, domestic satellite operations are affected by international law and regulation. The reasons are obvious. No country owns space (although some countries are pressing that claim). Satellite signals do not stop at national borders. Satellite orbital slots and spectrum space are finite. Were there no need to coordinate satellite operations with other nations and, in effect, share space, the U.S. would have far greater flexibility in the domestic use of satellites. Additionally, of course, the U.S. is not only interested in obtaining greater flexibility for domestic commercial satellite operations. Domestic satellite needs must be balanced with military and other governmental satellite requirements.

International communications policies are established by the International Telecommunications Union (ITU), an agency of the United Nations with 154 member countries. ITU holds periodic World Administrative Radio Conferences (WARC) on a wide range of telecommunications matters. Agreements reached at these conferences are ratified as international treaties by members and then become part of ITU Radio Regulations. WARC conferences also often result in follow-up regional conferences to fill in the important details of general WARC policies. The U.S., for example, will participate in 9 such specialized conferences over the next 7 years.

Two recent WARCs, one in 1977 and another in 1979, dealt with satellite issues vital to domestic operations. Among other things, the 1977 WARC developed a regional approach to satellite allocations and an interim plan for the development of domestic fixed and broadcast satellite operations in Region II (Western Hemisphere).

In the 1979 WARC the most significant satellite issue in terms of domestic operations was the allocation of frequencies in the Ku band. This was important to the government and domestic satellite operators for several reasons. Given the virtual saturation of the C band, higher frequency Ku band operation represents the only significant growth area over most of the next decade. There are now only 6 satellites assigned to the Ku band in Region II, most not yet operational. Additionally, the technology for Ku band operation has been tested extensively by NASA and private companies during the past 5 years.

The U.S. was able to reach a compromise with Canada and other Western Hemisphere nations that resulted in doubling the Ku band spectrum allocation to 1000 MHz. The net result is that, subject to the working out of key details at the 1983 Region II Conference, as well as FCC proceedings and Senate confirmation of the WARC treaty, the prospects for more domestic satellites operating in the Ku band are good.

Despite this apparently favorable conclusion, international regulatory issues do offer some future uncertainty in the satellite field. Developing countries have a strong interest in satellite communications. Many such nations, fearing they will be frozen out, want guarantees of orbital slots and frequencies for their own future domestic operations. The U.S. and other developed nations have traditionally opposed such "set-asides" on the grounds that spectrum resources would be unnecessarily wasted and that in any event advancing technology will solve future allocation problems. This view generally prevailed at the 1979 WARC. However, WARC did call for an international space conference in the next 5 to 7 years with the aim of insuring equitable access to spectrum and orbital positions. But the manner in which this access would be accomplished was not spelled out.

Of more immediate concern to the domestic satellite arena is a variety of national policy and regulatory issues beginning to appear in FCC and Congressional proceedings. One view is that the rapid pace of business activity in the commercial satellite field combined with short term orbital and transponder shortages at a time of increasing demand is beginning to test the FCC's basic satellite policies. Whether this is true, and whether the problems resulting from these pressures will be resolved by technical advances, it remains clear that new and sometimes unanticipated satellite issues are cropping up with increasing regularity. At the same time, revital-

ized Congressional efforts to rework Title II of the 1934 Communications Act add a further measure of uncertainty.

The FCC's basic policies for domestic satellite operation stem from the *First Report and Order* and *Second Report and Order* (Docket 16495) adopted in 1970 and 1972, respectively,[9] which declared a policy of open, competitive entry in the satellite field. Essentially, those policies have not changed, although decisions in such related areas as resale and shared use (Docket 20097)[10] and the deregulation of receive-only earth stations[11] have also had an important bearing on domestic satellite operations. Primarily because of the increased demand for satellite orbital positions and shortage thereof, the demand for transponder access, and the business practices of satellite carriers, new questions are arising. One question goes to the very core of the FCC's satellite policy: in any era of scarcity, is an open entry, first come, first served policy possible and appropriate? Do public interest considerations argue for some different approach to allocating valuable orbital slots? Southern Pacific Communications, a prospective satellite operator that now leases satellite time from RCA, recently opposed Hughes Communications' application for C band orbital slots and, among other things, suggested that the FCC institute comparative hearings to determine which entities should receive scarce allocations. Southern Pacific argued, "the Commission can no longer merely grant orbital slots on a first-come, first-served basis. The public interest requires that the Commission find what would be the most effective use of these remaining preferred orbital slots."[12] A related question concerns the obligation of carriers to serve all customers and areas of the country. Satellite users in the non-contiguous states, for example, believe that the FCC should require satellite operators to provide equal service, although under current technology and available orbital slots this may not be possible. Should carriers be allowed to operate satellites providing service to only limited portions of the country? The procedures of carriers in assigning transponders to customers has also been called into question. Two satellite distributors—Spanish International Network and Eastern Microwave—

[9]22 FCC 2d 86, 18 RR 2d 1631 (1970); 35 FCC 2d 844 (1972).
[10]*Resale and Shared Use*, 60 FCC 2d 261 (1976) and 62 FCC 2d 588 (1977).
[11]*First Report and Order*, Common Carrier Docket No. 78-374 (October 18, 1979).
[12]*Satellite Week*, February 4, 1980, p. 3.

have alleged that RCA has favored large bulk customers over smaller users in violation of the Communications Act. The aggregation of services intended for one class of end users—all cable services on a single satellite, for example—makes it important for a company planning such a service to gain access to the satellite toward which most of the earth antennas are oriented. Whether this is a regulatory problem remains to be seen. Transponder subleasing raises similar questions. A large satellite user can contract for more transponder time than it actually needs in order to insure future availability of capacity. This user can now sublease transponder time to another user. However, in doing so he is not acting as a carrier. Thus, he subleases to whom he wishes, and presumably not to a potential competitor. These kinds of concerns at least suggest the possibility that traditional common carrier regulation may need to be rethought. The FCC is expected to begin a new satellite proceeding later this year that will address many of these issues.

Satellite developments raise other communications policy issues. For example, the FCC has recently permitted in at least two cases the establishment of satellite-fed translators.[13] Yet, as a matter of policy, the FCC previously has intended translators to be used to retransmit and extend the signals of nearby broadcast stations and not as primary broadcast outlets. This appears to be a departure from traditional translator policies with broad implications.

Perhaps the thorniest satellite-related issue facing the FCC is the prospective application of Comsat to establish a DBS system in the mid-1980s. Aside from a variety of questions concerning Comsat's role as a government chartered corporation in such a venture, the FCC must deal with the complex question of how, from a regulatory perspective, such a service should be treated. Is it a common carrier or broadcast service? Comsat plans to file an application in 1980. The FCC has established an inter-bureau internal study of DBS issues which should be completed this year. Similar studies are underway at NTIA. At the same time, the House Communications Subcommittee has scheduled hearings to investigate Comsat's structure and operations, including its role in the domestic business.

[13]Spanish International Network has been authorized to construct 1,000-watt television translators in Hartford, Connecticut; Austin, Texas; Bakersfield, California; Philadelphia, Pennsylvania; and Denver, Colorado. A similar arrangement has been authorized in Alaska.

Technical Developments

The extent to which many of the potentially troublesome regulatory issues can be headed off depends in part on technical research and development activity now underway in several segments of the satellite field. Avoiding satellite capacity shortages, increasing the business and service flexibility of satellite operators and users, lowering costs, and developing new satellite services all are closely tied to technical development activities of NASA, major satellite contractors like Ford Aerospace and Communications Corp., General Electric, Hughes Aircraft, RCA, Comsat, and a host of smaller companies and even individual entrepreneurs. The field is highly complex and the efforts are costly. Nevertheless, the prospects appear brighter than they have in many years. NASA has launched an ambitious 5 year satellite research and development program, and private firms, stimulated by the burgeoning commercial market, are undertaking their own research and development. Generally, technology development falls into two broad categories: satellite/space segment, and earth terminal research and development.

The principal objectives in the space area are to increase capacity and efficiency of satellite operations in frequency bands already being used as well as to open up new bands for future use.

A variety of techniques now being tested could either improve current satellite operations or be integrated into new satellites in both the C and Ku bands. These techniques would allow more information to be handled by a single satellite transponder than is possible under present transmission and modulation techniques. For example, bandwidth compression techniques may make it possible to transmit two or more TV signals on one transponder, and can certainly increase the amount of voice or data traffic. Another important area, given the limited frequency available for satellite transmissions, is frequency re-use techniques. This is possible through what is known as polarization diversity, essentially transmission on different spatial planes. Frequency re-use through space diversity involves using several isolated and narrower satellite beams to transmit to earth stations a suitable distance apart. Another important development is the time division multiple access technique. This permits several ground stations to share a single transponder simultaneously because the digital signals are multiplied on the basis of time, not frequency. With a sophisticated switching system, satellites

can essentially juggle and sort out several "conversations" at the same time. Much technical development and experimentation in these and other areas is being carried out by NASA and satellite contractors and carriers. In general, the scenario for the mid- to late-1980s is for new, larger, more powerful satellites with multibeam antennas employing these kinds of techniques. New satellites are also likely to have a longer design life.

Longer term is development of the Ka 20/30 GHz satellite band, also a top priority of NASA. Ka band is regarded as the last opportunity for opening up significant new satellite capacity. Before this is possible, however, such problems as signal loss from rain attenuation, and the high cost of Ka band hardware, will have to be resolved.

Limiting testing in the Ka band was done in 1975 with the ATS-6 satellite. However, because private sector R&D has been based on nearer term profit potential, little commercial research has been focused on Ka band use. Thus, the importance of NASA's long term research and development in this area. It is believed that Ka band use is at least 5 to 7 years off.

Another NASA R&D priority involves development of satellite technology to help meet growing narrowband (voice and low data rate) service needs. Public safety, search and rescue, electronic mail, mobile telephone, and environmental monitoring are among the services possible. Generally, the satellite technology necessary for development of such services includes large antennas, multiple access techniques permitting channels on demand for a large number of infrequent users, and small, interactive terminals.

Even further in the future are prospects for geostationary platforms. Such platforms with several very large multibeam antennas might greatly increase satellite channel capacity at a reduced cost. They would have equipment for other space applications, allow for the pooling of basic support systems, provide in-space switching of signals, and employ "pencil beams" to convey information to individual earth stations. However, these developments are at least 10 and more likely 20 years off.

Perhaps before space platforms are a reality, we will see the development of what is called "satellite strings" or "satellite clusters"—satellites lined up in orbit and connected by intersatellite links, or a central signalling and switching satellite surrounded by slave satellites. Both concepts could realize some of the objectives of a space platform, but at a lower cost. One of the most attractive

features of the geostationary platform is that it could replace many smaller satellites and provide for more orbital slots.

Another key technical development is initiation of U.S. Space Shuttle flights. After a decade of development, at an estimated cost of $8.5 billion, NASA plans to begin manned shuttle flights by the end of 1980. When fully operational, the re-usable shuttle will have an important impact on the domestic satellite business. For example, the shuttle will be able to carry into orbit larger satellites at a lower cost than conventional rocket launches. The shuttle orbiter can also be used to repair satellites in space or bring them back to earth intact. Currently NASA plans to build four orbiters, and the shuttle manifest lists some 40 flights between 1980 and 1984. AT&T, RCA, Western Union, and SBS all have scheduled satellites for shuttle launch.

The strong growth of the domestic satellite business has spurred many technical developments related to ground satellite operations. As noted earlier, the most important development has been the refinement and reduced cost of receive-only earth stations. Technical advances have improved ground station receivers, antennas, and other earth station components. Early receivers used with small earth terminals were usually fixed, single-channel devices; now, remote control receivers, tunable to all of a satellite's transponders, are routinely available. Many improvements are designed to maximize earth station flexibility—allowing the operator to easily tune in other channels or even satellites—by automating functions.

Others are designed to improve antenna performance. Hughes Aircraft has developed an "expansion ring" that in effect increases the size of an antenna. Since 1973 Comsat has been developing a TORUS antenna capable of simultaneously transmitting or receiving as many as 7 signals from different satellites along a 20° arc. The cost of the system, which employs a rectangular concave dish, remains in the $1 million range, but Comsat is also developing a scaled down version of the antenna that could sell for under $100,000. Comsat has sought FCC approval to use TORUS at several U.S. INTELSAT sites.

Other technical advances are focused on providing in-space security for satellite transmissions. Oak Communications, Comsat, and ITT Space Communications, Inc. are developing scrambling devices to prevent unauthorized use of satellite transmissions. General Telephone & Electronics (GTE) recently developed a low sidelobe antenna system that limits interference from adjacent satel-

lites or terrestrial transmissions. Such antennas improve the feasibility of placing satellites closer together in orbit—perhaps within two to three degrees—and also could be valuable in urban markets where microwave interference is a serious problem.

Business Developments and Trends

The prospects for change in the domestic satellite environment also hinge upon business and operating strategies employed by a variety of commercial and noncommercial entities in the satellite field. While it is difficult to anticipate business strategies, service refinements, and market entry, developments in these areas will have an important impact over the next decade. The way the satellite business has changed in less than a decade is reflected in the words of E. H. Griffiths, President and Chief Executive of RCA:

> Let me offer an example out of RCA's experience in developing a domestic satellite communications system . . . a system that became profitable this year after four years of operation. In the planning stage, we believed its greatest single market would be the American television networks. We felt they would prefer satellites to their traditional use of land lines. That idea proved premature. We went on to the concept of a private-line switched telephone service that would permit satellite channels to be assigned on demand between any two locations served. We thought the demand would be heavy, especially from government and industry. We started to build a ground system of earth stations with extensive multiplexing facilities. Again the projections were off the mark.
>
> The major demand for our service has turned out to be the transmission of programming for cable television . . . which we did not expect to come until several years later. Fortunately, there was never a problem with the satellites themselves. They had the flexibility to handle any of these different services. But had we built the earth stations originally planned, with large-volume multiplex equipment constituting half the cost, we would have invested many millions of dollars more than were necessary. Others have made comparable miscalculations.[14]

The increased demand for satellite service coupled with short-term capacity limitations has already had an important impact on business strategies. It has led to increased competition as new vendors like Hughes, Southern Pacific, and SBS vie for a share of the

[14]"Telecommunications in the Future . . . Promise and Practicality," *Communications News*, October, 1979.

market or, in the case of Western Union and American Satellite Corporation, consolidation.[15]

Competition has also led to market segmentation and specialization. RCA has maneuvered to capture the cable service market, while Western Union has courted broadcast users. The increase in the number of user-owned or shared earth terminals has led carriers to establish service arrangements specifically tailored to customer needs. For example, a recent Western Union rate hike for video-services was based in part on a desire to differentiate rates for customers only requiring space segment service. Hughes Communications, which has not proposed an extensive network of ground facilities, seems most interested in leasing satellite time to customers with their own terminals.

In the satellite brokering field the prospects are for both new entrants and new ventures by established brokers. Satellink of America, a subsidiary of Robert Wold Co., was formed to provide customers portable earth stations for common carrier satellite interconnection services. Western Tele-Communications, Inc., a terrestrial carrier, United Video, Inc., and the Public Service Satellite Consortium have similar plans. It also appears likely that existing resale carriers will expand their service offerings. For example, Satellite Syndicated Systems, which already distributes "superstation" WTBS and operates the Satellite Program Network, an advertiser-supported program service, has plans to initiate a video-text service for cable systems.

The more competitive environment among satellite carriers has already led to refinements in the pricing of satellite service and in the terms of service offered. As more large users begin to rely on or plan for satellite distribution, demand for full-time protected transponders is increasing.

In early 1980 nine firms—including CBS, ABC, Hughes TV Network, Bonneville Broadcasting, and Spanish International Network—leased full-time transponders from Western Union.[16] One

[15]In October, 1979, Western Union reached agreement in principle with Continental Telephone Corp. and Fairchild Industries, Inc., co-owners of Amsat, whereby the two firms would each invest up to $50 million in Western Union's satellite system. The agreement provides that for approximately $32 million, Amsat's lease of Westar capacity be converted into a 20 percent interest in the system. Continental and Fairchild each would also receive a 25 percent interest in Western Union Space Communications and contribute to the cost of operating the TDRSS satellites.

[16]According to *Broadcasting* magazine, 19 companies replied to a Western Union customer solicitation with "firm orders." *Broadcasting*, February 4, 1980, p. 85.

possible result of this rising demand is transponder time sharing. Increased demand may also create pressure toward higher rates, although in general satellite costs remain strongly counter-inflationary. Many observers believe that the activation of fully digital satellites like Advanced Westar and the SBS satellites will ultimately result in lower cost satellite circuits.

The services distributed by carriers could also have important effects on the satellite ground environment. For example, if cable operators find they need to be able to receive service from several satellites, the number of cable systems with more than one earth station will increase dramatically.

Over the next few years the most important business developments may be those associated with satellite users. One of the most significant trends to emerge is the increased use of satellites by commercial broadcasters.

Elements of the broadcast industry have taken advantage of satellite distribution to meet special needs for some time. The commercial networks routinely use the INTELSAT system to relay live or delayed sports and news from abroad.[17] They also employ satellites for domestic news distribution and for West Coast studio feeds to New York. For several years syndicators or news organizations like Independent Television News Association, Hughes Television Network, Robert Wold Co., and the religious broadcasters have used satellites to feed program material to a relatively small number of television stations, mostly independents, or to create ad hoc networks.

For the most part, however, broadcaster use of satellites has been, until recently, supplemental to terrestrial transmission, usually limited to special occasions, and dependent on the earth station facilities of carriers or satellite brokers.

Now major group owners, independent stations, and even network affiliates are investing in earth terminals; radio networks are planning a massive plunge into satellite distribution; the three networks are planning for satellite distribution; and some broadcasters—particularly those with multiple media holdings—are exploring new satellite-related business opportunities. For example,

[17]One measure of the impact of satellite technology is the increase in international news that regularly makes its way onto the network news programs. Primarily this is due to the fact that the three networks—which together spend over $30 million annually to cover foreign news—now contract for a daily international satellite feed at a rate of about $1,500 for the first ten minutes.

Westinghouse Broadcasting and Storer Broadcasting have made deals to install or share earth terminals at their stations. Westinghouse has signed a contract with Western Union to relay syndicated programs and news to its own and other stations. The commercial networks have solicited proposals for satellite service. RCA has offered to supply earth stations at no charge to all commercial broadcasters. RKO, ABC, and Mutual Broadcasting are establishing or planning satellite networks for radio service. In a related development, John Blair & Co., an advertising agency, is planning to begin satellite distribution of ads to broadcast stations later this year.

Newspaper companies and other news organizations will also be major satellite users. AP and UPI already use satellites to feed news to cable systems or to relay news photos. AP has announced plans to install up to 400 earth terminals to distribute the AP Radio Network and all high speed data services. Part of the system will be shared with RKO. Other news agencies may join the system on a shared cost basis. Such sharing will permit a newspaper or broadcaster to receive a variety of news services with one earth station.

A recent study by the American Newspaper Publishers Association suggested that satellite delivery of national ads to newspapers is technically and economically feasible and would significantly reduce transmission costs. Dow Jones, Time, Inc., and *U.S. News and World Report*, among others, already use satellites to deliver editorial material to regional printing plants.

Yet another potentially significant business development is the growing use of satellite communications by the nonprofit, public service sector. Educational institutions, hospitals, and similar organizations generally have not benefited from commercial satellites because of what is commonly referred to as the "thin route" problem. That is, because they usually have short-term, intermittent, and low volume communications requirements and are widely dispersed, individual public service agencies have not been able to afford satellite time. One solution to this problem is to aggregate the nonprofit market so that the cost of satellite capacity and facilities can be shared. The Public Service Satellite Consortium (PSSC), the Telecommunications Cooperative Network (TCN), the Appalachian Community Services Network (ACSN), and the American Educational Television Network (AETN) have been formed to carry out this function or to distribute services to widely dispersed users.

Under the Carter Administration's 1978 Civil Space Policy, NTIA has initiated a grant program to help such organizations make

the transition to commercial satellite use.[18] If this catalyst program is successful, greater use of domestic satellites by public service groups is likely in the 1980s.

Public Broadcasting and Domestic Satellites

Like the other technologies and services analyzed in this report, domestic satellite communication brings both new prospects and new competitive challenges to public television. Yet more so than in any of the other new technologies, public television has already moved boldly into the satellite era.

Public broadcasting committed itself to satellite distribution when the technology was still questioned and the territory largely unknown. It was the first established broadcasting system to do so, and it moved in the face of warnings that satellite distribution would weaken the system, not strengthen it. This pioneering role can be a source of great strength to the system. Public broadcasters have gained invaluable technical and operating experience in the satellite field. The television system has been reorganized in part to take advantage of the new satellite capability.

While the satellite system is now operational, public television is already addressing unfinished business. Expanding the system's uplink capability, now confined to six regional sites, is being considered. Utilization of PBS's three dedicated Westar transponders (and a fourth for occasional use) for such add-on services as the DATE stereo/dual language system, internal communications, and even teletext distribution is underway or being considered. Remote control systems to coordinate switching among regional uplinks and remote cueing to allow programs to be addressed to stations for overnight recording can enhance system efficiency. Satellite hookups with other local distribution systems such as CATV, Instructional Television Fixed Service, and translators also need to be explored. The proliferation of broadcast services on the Westar satellites may create new programming opportunities for PBS stations, as does the availability of mobile uplinks, and the possibility of direct satellite feeds from abroad through Comsat. On a longer term basis the system will have to confront the ramifications of Ku band satellite development for public television.

[18]Throughout the 1970s many public service organizations used the NASA ATS-6 and the Canadian/American CTS experimental satellites. Both have been deactivated.

An intriguing prospect now being explored by several public service satellite organizations is dedication of an unused portion of the lower frequency S band (2500–2690 MHz) to public service and public broadcasting satellite operations. S band technology is similar to that of the well-developed C band. In the future, marketplace pressures and congestion problems might create an argument for reservation of frequency for public service and public broadcasting applications.

In the short term, however, we believe the immediate opportunity and priority for public broadcasting is the development of new program and service concepts like PACE, which take full advantage of the evolving domestic communications satellite environment.

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CHAPTER FOUR

The Cable Television Industry

Overview

Cable television emerged in the late 1970s as the strongest of the alternative video technologies examined in this report. Cable has experienced rapid growth in the past five years and appears well positioned for even greater expansion. An estimated 4,100 cable systems now serve 16 million subscribers, or 21 percent of U.S. homes. Cable plant currently passes 40 percent of the population. By 1985 the number of cable subscribers should nearly double and national penetration—the number of subscribers expressed as a proportion of all television homes—will approach 35 percent. This growth will come internally—by adding subscribers in existing systems—and by more rapid introduction of cable in major urban areas where most of the population lives.

Cable television systems were first established in communities where over-the-air home reception of broadcast signals was impossible. Large community antennas received the signals and then retransmitted them over coaxial cable to home television sets. The importance of cable rests in this ability to deliver information and pictures directly to the home without interference from over-the-air users of the spectrum. Coaxial cables are able to carry over 50 television signals.

The use of domestic satellites to distribute programming and the availability of low-cost receive-only earth terminals (TVRO) led to the first real-time national cable networks in the mid-1970s. With satellite transmission, program distributors can effectively create a full-time network for the cost of leasing a satellite transponder—about $1 million annually. Nearly 3 dozen cable satellite services

have emerged in the past 5 years. Most are carried on an RCA satellite. Thus, cable operators with a single earth terminal can select from a wide range of program services. About 2,300 cable systems have TVROs that cost as little as $10,000, including installation. Some cable operators are installing second TVROs in order to receive more satellite programming.

Over 2,000 cable systems now provide at least one pay service, and in 1979 pay cable generated nearly half a billion dollars. Pay cable has been responsible for increasing subscriber penetration in existing systems and is seen as the key to making profitable major mark t systems that are most costly to build.

Distant "superstations" and specialized sports, news, children's, and entertainment satellite services have broadened the appeal of cable service. The creation of a national audience for specialized programming and the opportunity for demographic targeting has stimulated interest in cable from such major advertisers as Bristol-Myers, Warner-Lambert, Anheuser-Busch, General Electric, and Milton Bradley Co.

The availability of several satellite-delivered services—pay cable, advertiser-supported, and otherwise subsidized—has led to "tiering" of cable services—the offering of different service packages at different rates. Tiering has provided cable operators new marketing flexibility and the opportunity to increase penetration levels and generate additional revenues.

A significant percentage of existing cable systems are not able to take full advantage of the new satellite services because of system channel capacity limitations. More than half of all cable systems have 12 channel capacity or less, because the cable delivers the signal to the set without a converter. However, the use of converters that replace the tuner in the TV set and effectively increase channel capacity to as many as 26, 35, and even 52 channels is growing. New systems now being built in urban areas are likely to have 52 channels or more and be capable of two-way operations.

During the past three years there has been a trend toward increased consolidation in the cable industry, with major media companies like Times-Mirror Communications, Newhouse, and Storer Broadcasting stepping up their involvement in the cable industry. Large conglomerates such as American Express have also entered the industry. Some cable companies are also diversifying into commercial broadcasting, STV, MDS, and program production.

Major cable companies are now vying for franchises in the nation's biggest cities. Franchises have recently been awarded in

Pittsburgh, Houston, Atlanta, Minneapolis, Cincinnati, and other major urban areas.

A combination of FCC deregulatory actions and favorable court decisions has stripped away much of the restrictive regulation that hampered cable in the sixties and early seventies. Courts have struck down the FCC's pay cable and access rules and in so doing have circumscribed the FCC's regulatory authority over cable. The Commission appears to be on the brink of eliminating or easing its complicated signal carriage and exclusivity regulations. While this cable deregulatory trend is expected to continue, such regulatory matters as common carrier status for cable, "retransmission consent," multiple ownership limitations, and antitrust questions do pose some regulatory uncertainty for the industry.

While most cable service development remains focused on satellite delivered video services, the cable industry is slowly beginning to introduce two-way security services and information retrieval services. As new major market systems are activated over the next five years, additional two-way services should become more common.

Summary of Recommendations for Public Television

The chapter's last section is concerned with public television's relationship to the cable industry. The chapter makes the following recommendations and observations:

- The practices of the cable industry are largely a matter of local company policy. Accordingly, we recommend no national strategy for cable use, but confine ourselves to local matters.
- Public stations should not involve themselves in the operation or development of cable systems, but should concern themselves with the use of cable for the delivery of programming and services.
- Cable has been and will continue to be a significant tool for the expansion of public television to unserved areas. However, the notion of a public television "superstation" seems to have no basis in sound policy.
- Public stations should be open to cooperation with cable companies in the use of dedicated channels for distribution of noncommercial programming, especially educational and target audience programming. The possibility of co-production of such programming with cable companies should be ex-

plored as well as the use of public television programs by special pay services.

- Although subject to regulatory uncertainty, the sharing of facilities, especially satellite facilities, by cable companies and public broadcasters would be of benefit to both enterprises.

Historical Development

Unlike most of the media discussed in this report, cable television is not really new. The technology, that of transmitting electrical signals over a shielded copper wire, has been available for half a century. Cable television service is now 30 years old. It developed in tandem with television broadcasting because of spectrum scarcity and government television allocation policies that left millions of people without access to television.

In broad terms, cable television's 30 year history can be seen in 3 distinct phases. From its origins in the late 1940s until roughly the mid-sixties, the industry was in what is commonly referred to as its "master antenna period." Essentially, community antenna television (CATV) served one purpose—to provide or improve reception of local or nearby television signals. CATV was not seen as a competitive threat to commercial broadcasting; it was merely an adjunct to television, extending the signal. At the end of 1965, 1,570 CATV systems provided service to 1,575,000 subscribers, or 3 percent of U.S. homes.[1]

From the mid-sixties until about the mid-seventies, cable passed through a highly charged and complex transitional era. To increase the attractiveness of CATV service, cable operators began "importing" television signals from distant communities via microwave, providing simple automated time, weather and news channels, and even locally originated programs. As CATV channel capacity increased—first from 3 or 5 channels to 7 or 9, and then to 12 channels—entepreneurs and academics alike began to recognize the industry's potential. Cable companies had already begun obtaining or acquiring additional franchises in nearby communities. This led to the rise of the Multiple System Operator (MSO), a corporation owning and operating cable systems in many parts of the country. MSOs could provide the capital necessary to build larger, more

[1]Sterling, Haight, *The Mass Media: Aspen Institute Guide to Communication Industry Trends*, (New York, Praeger Publishers, 1978) p. 56.

sophisticated systems, as well as administrative, marketing, and programming expertise. But perhaps the dominant aspect of this period was political and regulatory struggle. By the mid-sixties, broadcasters and copyright owners had come to see cable as a competitive threat. In 1965 the FCC began regulating cable, and over the next seven years increasingly restrictive regulations were imposed. Although a partial thaw in the FCC's freeze on major market CATV development was achieved in 1972, it was also at this time that several large MSOs overextended themselves and came close to bankruptcy. Cable penetration levels had begun to plateau, and the financial community began to cool toward the industry. At the end of 1972, 2,991 cable systems provided service to 7.3 million subscribers or 11 percent of U.S. homes.[2]

In the mid-1970's, the development of pay television and satellite networking marked the emergence of cable as a national medium and thrust it into the most buoyant period in its history.

The new satellite-delivered services allowed the industry to expand well beyond its signal reception role. Cable marketing became more savvy. The industry embarked on a massive program to obtain rate increases and many MSOs negotiated favorable long-term lending arrangements. During this period the regulatory picture brightened considerably. The industry successfully challenged restrictive FCC pay cable rules, and resolved a long-standing copyright liability dispute by supporting legislation requiring limited copyright payments. Technical advances resulted in the opportunity for more sophisticated, larger capacity cable systems. This continuing "national" era also sees increasing consolidation within the industry, as well as diversification into such related fields as STV, MDS, program packaging and production, and security service.

Cable television has established itself de facto as a part of the nation's communications structure. As it enters the eighties, cable appears well positioned to become an even more prominent part of this structure. Part of the reason is versatility. CATV's broadband multi-channel distribution capability allows it to be used for many purposes. Its interactive or two-way transmission capability further enlarges its potential. Cable's technical versatility also allows it to make use of related communications technologies and services. Domestic satellite communications, for example, have helped the industry enormously; the industry may also be helped by developments in fibre optics, videotext, and computer technology. In addi-

[2] *Ibid.*, p. 56.

tion to its technical versatility, cable's position is enhanced by its ubiquity as a local distibution medium. It can serve not only the home market, but businesses, institutions, and government, all of which have growing communications needs.

Considerable cable expansion is probable in two ways: the penetration of cable in existing markets will increase, and the introduction of cable service to large new markets will accelerate. Cable is currently available to about 40 percent of the nation's homes, still mostly located in smaller cities and rural areas. See Table 4-A (Cable Television Penetration of Top 50 Markets). However, since 1973 the fastest growth has been in the larger markets. See Table 4-B (Cable Television Penetration by County Size).

Since most of the population lives in major urban areas, planned expansion into those areas will quickly increase the number of those able to choose cable service. The versatility of cable is most important in the cities, since it is here that diversity of audiences and demand for specialized business services is greatest.

As for existing markets, of those households able to receive cable service only about 40 percent have chosen to subscribe. As these systems upgrade and add more services, their penetration rates will increase. Moreover, the new, urban systems have more elaborate programming services available, and are now achieving higher subscription rates.

Current Statistics

As of early 1980, an estimated 4,100 cable systems were serving 16 million subscribers in approximately 10,000 American communities. Cable penetration—the number of homes served as a percentage of U.S. TV households—stands at 21 percent. About 40 percent of all homes passed by cable, and thus able to subscribe, now receive the service. In all, more than 35 million, or 46 percent, of American households are passed by cable.[3]

The ten largest cable companies account for 39 percent of all cable subscribers. The 25 largest cable companies serve almost 9 million subscribers, or about 55 percent of the total. The largest cable operator, Teleprompter Corp., serves nearly 1.3 million subscribers and operates 114 systems. By comparison, the tenth largest company, UA-Columbia Cablevision, Inc., operates 25 systems

[3]Unless otherwise noted, all figures are as of 1/1/80. All the statistics in this chapter, except where noted, are from Paul Kagan Associates.

Table 4-A, Cable Television Penetration of Top 50 Markets

RANK	MARKET	ADI TV HH	CABLE HH	%
1.	New York	6,398,000	930,800	15
2.	Los Angeles	4,050,700	617,500	15
3.	Chicago	2,849,700	87,800	3
4.	Philadelphia	2,399,300	480,700	20
5.	San Francisco	1,883,600	559,500	30
6.	Boston	1,807,200	208,200	12
7.	Detroit	1,600,100	25,200	2
8.	Washington	1,397,600	120,100	9
9.	Cleveland	1,348,900	210,600	16
10.	Dallas-Fort Worth	1,175,100	82,200	7
11.	Pittsburgh	1,137,100	400,200	35
12.	Houston	1,104,300	71,100	6
13.	Minneapolis-St. Paul	994,300	51,200	5
14.	St. Louis	980,200	30,300	3
15.	Miami	943,500	60,500	6
16.	Atlanta	936,100	101,500	11
17.	Tampa-St. Petersburg	899,000	147,500	16
18.	Seattle-Tacoma	914,800	230,800	25
19.	Baltimore	806,500	19,900	2
20.	Hartford-New Haven	758,600	207,200	27
21.	Denver	755,600	55,200	7
22.	Indianapolis	744,600	126,000	17
23.	Sacramento-Stockton	701,400	130,900	19
24.	Portland, Ore.	682,900	113,000	17
25.	San Diego	675,100	255,500	38
26.	Milwaukee	655,600	21,800	3
27.	Kansas City, Mo.	652,800	99,500	15

serving 300,000 subscribers.[4] See Table 4-C (Ranking of Top 50 Cable System Operators).

Over 2,000 cable systems, or about 50 percent, now provide at least one pay TV service. As of January, 1980, there were an estimated 5.3 million pay cable subscribers.[5] The 2,000+ systems offering pay service provide basic service to an estimated 13.2 million homes. Thus, the pay-to-basic ratio--the percentage of cable subscribers offered pay service who choose to subscribe—is now 40 percent.

[4]System subscriber figures are as of 10/1/79. See Table 4-C.

[5]Donaldson, Lufkin & Jenrette, *Industry Viewpont: The Cable Television Industry* (Donaldson, Lufkin & Jenrette Securities Corp., New York, 1979), p. 7. We wish to thank D, L & J for their permission to use this extremely helpful document, prepared as a service to investors.

Table 4-A, Continued

RANK	MARKET	ADI TV HH	CABLE HH	%
28.	Cincinnati	647,200	36,400	6
29.	Buffalo, N.Y.	628,600	160,100	25
30.	Nashville	579,100	53,600	9
31.	Phoenix	575,200	31,200	5
32.	Charlotte, N.C.	549,700	48,800	9
33.	Memphis	537,200	55,000	10
34.	New Orleans	529,600	39,400	7
35.	Columbus, Ohio	528,100	133,800	25
36.	Greenville-Spartanburg, S.C.-Asheville, N.C.	523,900	67,900	13
37.	Grand Rapids-Kalamazoo-Battle Creek, Mich.	518,100	131,700	25
38.	Providence, R.I.	512,700	17,600	3
39.	Oklahoma City	495,100	81,200	16
40.	Orlando-Daytona Beach	482,300	138,200	29
41.	Raleigh-Durham, N.C.	480,500	95,400	20
42.	Charleston-Huntington, W. Va.	480,500	190,000	40
43.	Louisville, Ky.	473,400	41,200	9
44.	Dayton, Ohio	454,400	92,500	20
45.	Harrisburg-York-Lancaster-Lebanon, Pa.	453,500	185,600	41
46.	Norfolk-Portsmouth-Newport News-Hampton, Va.	447,100	45,000	10
47.	Salt Lake City	443,200	46,500	10
48.	Albany-Schenectady-Troy, N.Y.	440,500	155,100	35
49.	Birmingham, Ala.	436,200	65,900	15
50.	Wilkes Barre-Scranton, Pa.	435,300	234,700	54

Source: Arbitron

Although the pricing of basic cable service is now becoming more complex, typically cable customers pay a one-time installation charge of $16 and a monthly basic service charge averaging just over $7. Installation fees are often waived in the early months of cable service offerings and tend to be much higher in areas of low subscriber density. Monthly service fees in larger systems in and around urban areas are also higher than the national average—usually between $8 and $10.

The average installation fee for pay cable service is $15. This fee is often waived, particularly if pay service is obtained at the same time as basic service. The average monthly rate for a full-service pay channel is approaching $9.

Table 4-B Cable Television Penetration by County Size*

County Size	% CABLE PENETRATION OF TV HOMES (AS OF MAY)					
	1978	1977	1976	1975	1974	1973
A counties	7.8%	7.3%	6.3%	4.9%	4.3%	3.8%
B counties	17.2	16.2	14.1	11.4	9.5	8.7
C counties	33.2	32.0	29.5	27.3	25.7	24.9
D counties	20.6	19.9	17.9	16.6	15.4	14.7
Total U.S.	16.9%	16.1%	14.4%	12.4%	11.2%	10.4%

Source: A. C. Nielson Company.

*"A" counties are those located within the 25 largest U.S. Standard Metropolitan Statistical Areas; "B" counties are all those, not "A" counties, with populations over 150,000 or in metropolitan areas over 150,000; "C" counties are all those, not "A" or "B" counties, with populations over 35,000 or in metropolitan areas over 35,000; "D" counties are all the rest. These figures are based on the 1970 census.

In general, cable revenues flow from three sources: basic subscription (and installation) fees; pay cable fees; and the sale of advertising time. Total industry revenues in 1979 were $1.8 billion. Pay cable revenues amounted to $438 million.[6] Although there are no firm figures or even solid estimates for cable ad revenues in 1979, the FCC figures for 1978 show $4.85 million in ad revenue. Some industry observers feel that this figure is low.

At the beginning of 1980, the cable industry was estimated to have a total capital investment of $3–4 billion. The industry has installed over 290,000 miles of cable plant and is adding new plant at an estimated rate of about 50,000 miles per year. A CATV trade publication survey projects industry-wide capital expenditures in 1980 to exceed $1 billion, an increase of almost 40 percent over the previous year.[7]

A major change in plant configuration in the industry during the past few years has been the addition of satellite earth stations. Roughly 2,300 cable systems have installed or filed license applications for receive-only earth terminals. Most of these have antennas smaller than 5 meters.

Another factor relating to physical plant is the channel capacity of existing cable systems. Many older systems have only 12-channel

[6]Donaldson, Lufkin & Jenrette, *supra*, p. 11.
[7]*Cable Vision*, December 31, 1979, p. 33.

capacity because they are not equipped with converters. When a converter is installed, the subscriber has the capacity to receive more than the 12 channels the VHF tuner on the TV set permits. It is estimated that slightly over 11 million subscribers (approximately 70 percent of all subscribers) are not presently equipped with converters, but as older systems are modernized this number will decrease.[8] And, of course, virtually all news systems will be high capacity systems. Nevertheless, in a time of proliferating cable services, the limited channel capacity on existing cable systems is an important short-term constraint on the industry's potential.

No reliable data are available on the number of cable systems now operating with two-way capability. Over the past 5 years most cable systems have been built with the capability to convert to two-way, but estimates of the number of systems with activated two-way capacity range from 30 to 50.

Most CATV systems now provide at least one and sometimes several "automatic origination" services such as time, weather, news, or stock listing channels. According to an NCTA survey, 80 percent of systems responding[9] claim they provide local origination or "access channels." Local origination channels are usually controlled and programmed by the cable operator, although often schools and other community institutions contribute programming. Access channels, which were required by the FCC's 1972 rules in certain systems, are available to community groups and individuals as a means for local expression. Often the administration of access channels is turned over to local community organizations.

Current Regulation

There are essentially two tiers of regulatory control over cable television: FCC regulation at the national level and local regulation or control through the franchising process. In some states a third layer of regulation is provided by state government, or state regulation entirely replaces local franchising.

Federal regulation of CATV has evolved in a highly complex and controversial fashion, owing largely to the fact that cable has an uncertain status in communications law, which involves elements of broadcast and nonbroadcast communication. In *U.S. v. South-*

[8]For a detailed discussion of this issue, see *Appendix A*, pp. 228–229.

[9]Out of 3,800 systems queried, 925 responded, 744 of which provided local origination.

Table 4-C Ranking of Top 50 Cable System Operators
With Breakdown of Top 25 and Second 25
Status as of October 1, 1979. Data Obtained Directly From Operators.
EDITOR'S NOTE: When using totals, note that some figures for some categories were not available (N.A.) from some groups.

RANK	SYSTEM OPERATOR	NUMBER OF SUBSCRIBERS	PAY-CABLE SUBSCRIBERS	HOMES PASSED BY CABLE	HOMES IN FRANCHISED AREAS	MILES OF PLANT	MILES TO BE ADDED IN 12 MONTHS
FIRST 25							
1.	Teleprompter Corp.	1,234,800	376,500	2,564,800	3,450,437	25,700	1,944
2.	American TV and Communications Corp.	975,000	485,000	1,800,000	4,170,000	16,800	4,500
3.	Community Tele-Communications Inc.	781,000	270,000	1,500,000	N.A.	9,500	3,000
4.	Warner Cable Communications Corp.	660,000	200,000	1,125,000	N.A.	12,000	3,000
5.	Cox Cable Communications Inc.	655,871	295,845	1,294,755	1,921,192	12,600	3,278
6.	Times Mirror Co.	459,000	145,000	770,000	1,143,339	8,250	1,300
7.	Viacom Communications	415,000	153,000	800,000	1,150,000	6,500	1,000
8.	Sammons Communications Inc.	362,008	101,161	516,879	640,000	6,048	1,200
9.	Storer Cable TV Inc.	328,000	101,000	580,000	1,500,000	7,280	3,200
10.	UA-Columbia Cablevision Inc.	301,273	151,754	513,203	1,100,000	6,200	2,000

11. United Cable TV Corp.	281,473	117,882	513,191	841,151	5,002	1,775
12. Continental Cablevision Inc.	261,750	140,125	524,500	763,750	5,230	1,300
13. Cablecom-General Inc.	211,888	58,812	295,331	275,000	3,300	1,000
14. Service Electric Cable TV Inc.*	210,200	15,200	275,000	330,000	8,000	50
15. General Electric Cablevision Corp.	198,000	82,000	370,000	75,000†	3,500	500
16. TeleCable Corp.	193,000	64,000	325,000	372,500	3,890	755
17. Daniels & Associates Inc.	191,000	50,000	353,000	430,000	3,505	525
18. Midwest Video Corp.	184,912	21,082	N.A.	N.A.	N.A.	331
19. NewChannels Corp.	180,590	75,160	257,080	N.A.	2,990	245
20. Liberty Communications Inc.	156,000	21,860	290,000	355,000	3,850	700
21. Western Communications	123,900	19,300	167,900	174,900	1,727	52
22. Texas Community Antennas Group	122,370	8,000	160,000	164,000	2,380	60
23. Vision Cable Communications Inc.	118,500	38,000	190,000	300,000	2,950	1,000
24. Comcast Corp.	117,800	24,600	212,000	330,000	2,300	1,000
25. Century Communications Corp.	116,103	24,490	242,000	348,000	2,410	100
Total—Top 25	8,839,438	3,039,771	15,644,639	19,834,289	161,892	33,815

*Unbuilt areas only.

†No recent figures available.

Table 4-C (Continued)

RANK	SYSTEM OPERATOR	NUMBER OF SUBSCRIBERS	PAY-CABLE SUBSCRIBERS	HOMES PASSED BY CABLE	HOMES IN FRANCHISED AREAS	MILES OF PLANT	MILES TO BE ADDED IN 12 MONTHS
SECOND 25							
26.	Cablevision Systems Development Co.	114,000	109,000	286,000	525,000	2,975	1,500
27.	Horizon Communications Corp.	113,928	35,316	200,015	225,000	2,200	190
28.	Communications Services Inc.	106,000	20,000	160,000	185,000	2,200	250
29.	Wometco Communications Inc.	97,800	47,500	205,000	298,000	2,950	1,250
30.	Harris Cable Corp.	85,000	35,000	193,700	424,000	1,741	650
31.	Rollins Inc.	84,400	31,000	157,500	180,000	1,598	55
32.	Tele-Media Corp.	78,800	7,500	106,100	126,000	1,445	500
33.	Harron Communications Corp.	78,000	16,000	150,000	N.A.	1,200	300
34.	Colony Communications Inc.	75,652	30,016	141,803	286,869	1,443	600
35.	Gill Cable Inc.	75,000	75,000	180,000	220,000	1,400	40
36.	International Cable	72,100	39,950	140,000	150,000	1,050	70
37.	Televents Inc.	69,820	17,390	100,256	131,600	1,115	375

38. Westinghouse Broadcasting Co. Inc.	69,389	13,646	83,000	95,000	1,425	150
39. Heritage Communications Corp.	68,000	29,000	160,000	260,000	2,000	1,144
40. Multi-Channel TV Cable Co.	67,000	11,000	75,100	75,100	965	270
41. Plains TV Corp.	65,414	12,711	103,003	118,393	1,138	166
42. Suburban Cablevision	64,389	58,384	156,637	350,000	1,150	500
43. Toledo Blade Co.	59,000	17,000	120,000	N.A.	1,100	145**
44. Twin County Trans-Video Inc.	58,000	4,000	87,000	100,000	1,425	25
45. King Videocable	56,500	8,600	86,503	113,344	998	35
46. Palmer Broadcasting Co.	56,120	10,131	69,200	71,500	935	40
47. Cable Information Systems Inc.	54,000	20,000	80,000	100,000	1,600	175
48. Omega Communications Inc.	51,000	N.A.	65,000	N.A.	N.A.	100
49. A-R Telecommunications	47,748	16,206	99,669	117,237	1,011	300
50. California-Oregon Broadcasting Co.	47,000	N.A.	N.A.	N.A.	N.A.	N.A.
Total-2nd 25	1,814,060	3,039,771	3,205,286	4,152,043	35,062	8,830
Grand Total—Top 50	10,653,498	3,704,121	18,849,925	23,986,312	[illegible],954	42,645

Source: Television Digest, Special Western Cable Television Show Supplement, December, 1979.

**Includes rebuild.

western Cable Co., 392 U.S. 157 (1968), the Supreme Court found that the FCC's jurisdiction to regulate cable was based on its authority to regulate broadcasting. The court held that the Commission may exercise authority over cable television only to the extent "reasonably ancillary" to the Commission's jurisdiction over broadcast television. In *Home Box Office v. FCC*, 567 F.2d 9 (D.C. Cir.), cert. den. 434 U.S. 829 (1977), the D.C. Court of Appeals found the "anti-siphoning" rules of the FCC (described in detail in Pay Television, Chapter 5) beyond that jurisdiction. The United States Supreme Court, in *FCC v. Midwest Video*, 440 U.S. 689 (1979), found that the Commission's imposition of access requirements on cable systems was also not within the "reasonably ancillary" standard. Those decisions, holding that the FCC may not restrict cable program origination in ways that would be impermissible for broadcast television, represent a considerable narrowing of the Commission's asserted authority over cable.

The FCC's 1972 regulatory program reached into virtually all areas of cable—signal carriage, system capacity, technical standards, franchising, and even programming. Since then—and in part as a result of adverse court decisions—much cable regulation has been stripped away. The FCC is now on the verge of eliminating or at least modifying the major remnants of the 1972 rules: signal carriage restrictions and complex program exclusivity rules.[10]

In addition to federal regulation, some states have chosen to regulate cable television. The trend toward state regulation was strongest in the early and mid-seventies when the FCC was fashioning its cable regulatory program. In the past few years, however, interest in state regulation appears to have slackened. Table 4-D lists the 11 states with some type of regulatory control over cable operations. In states with a cable commission, the franchising power remains with local communities. In states with public utility type regulation, the franchising authority rests with the state agency, except in New Jersey and Delaware, where franchising power is local. Some other states have enacted legislation dealing with certain aspects of CATV, but have stopped short of comprehensive regulation.

[10]Generally, the Commission's signal carriage rules limit the number of distant signals a cable operator may import into a market. The exclusivity rules require cable operators to delete or black out certain programs if those programs have been sold to a broadcast station in the local market.

Table 4-D State Regulation of Cable Television

STATE	PUBLIC UTILITY TYPE REGULATION	INDEPENDENT CABLE COMMISSION
Alaska	•	
Connecticut	•	
Delaware	•	
Hawaii	•	
Massachusetts		•
Minnesota		•
Nevada	•	
New Jersey	•	
New York		•
Rhode Island	•	
Vermont	•	

Many state regulatory requirements are similar to or the same as requirements adopted by the FCC in 1972 and deal with such matters as franchise terms, construction schedules and technical capacities. Some states, like Massachusetts and New York, regulate ownership and other aspects of cable operation.

A principal feature of state regulation is supervision or regulation of CATV subscriber rates. Recently, several states, encouraged by the cable industry, have begun to simplify rate-setting procedures or even eliminate regulation of rates. For example, New Jersey has instituted a voluntary common tariff procedure. New York, Delaware, and others have permitted cost-of-living-type rate adjustments. In what some industry observers regard as a bellwether, California enacted a 1979 law generally deregulating control of subscriber rates by local authorities for cable systems meeting certain technical and service requirements.

Cable is regulated at the local level because it must obtain permission from local authorities to use city, town, or county rights of way to lay cable. Operators seeking a franchise to provide cable service in effect enter into a contract with the local authority to provide certain services for a fixed period of time, typically 10 to 15 years, and usually at specified rates. After the franchise is granted, some local authorities maintain a formal oversight function, but many do not. Most recent cable franchises are non-exclusive. However, as a practical matter, there are very few places where more than one cable system serves a franchise area.

Current Marketing and Services

Both the number and nature of cable service offerings have changed dramatically in the past three years. Until the mid-seventies, the typical cable service package was a mixture of distant and local broadcast signals, automated channels, and perhaps local origination and access channels. Some systems did buy syndicated programming for origination channels, displayed "free films," and experimented with channels offering comparative shopping information. Others experimented—or participated in government-funded experiments—with more esoteric services such as electronic shopping, security service, and interactive education. But in the main, the service offerings were limited to that basic mix of broadcast signals, limited program origination and access.

Then came satellite distribution and pay cable. This inaugurated the most important development of the late seventies—the increase in new or specialized programming services. It also led to new pricing and packaging configurations, which in the long run may be more important than many of the services now actually being provided.

There are several ways to categorize the range of new video services now provided by a growing number of cable systems. For example, it is possible to classify them according to content—sports, public affairs, children's, etc. The most useful classification, however, is the method of financing such services. Basically there are four approaches: (1) pay TV or direct subscriber-supported services; (2) free services (which may or may not include advertising); (3) operator/advertiser-supported services; and (4) services supported solely by operator payments. See Table 4-E.

The subscriber-supported services have had the most dramatic impact on the cable industry. They are discussed in the Pay Television chapter. There are several kinds of free services. They include the religious broadcast services such as Christian Broadcasting Network, Trinity Broadcasting, and the National Christian Network. Other free services include the Satellite Program Network and Modern Talking Pictures. All of these services are free in the sense that neither the operator nor subscriber pays directly for them. However, the cost of producing or packaging the program material is offset by the sale of advertising. Additionally, in some cases the cable operator is permitted to sell local advertising in time slots around the program. The packagers of free services are willing to

Table 4-E Cable Satellite Program Services Available or Announced

CABLE SERVICE (SUPPLIER)	COST PER SUB. PER MO.
SPORTS AND ENTERTAINMENT	
Madison Square Garden (UA-Columbia)	$1/yr. avg.
Entert. & Sports Network (ESPN)	$0.48/yr. avg.
Thurs. Night Baseball (UA-Columbia)	$0.33/yr. avg.
The New Prime Time	5¢ lst yr./free year 6
Black Entertainment Network	Free
BBC in America	If basic, 9¢; if tiered, varies from 9¢-24¢, as penetration decreases
Telefrance	N/A
English Channel	N/A
Total Communication Systems	Varies
Spanish International Network	Free
Satellite Program Network	Free
Modern Talking Pictures	Free
NEWS AND PUBLIC AFFAIRS	
C-SPAN	5¢
UPI Newswire	5¢
Turner Cable News Network	15¢ with WTBS; 90¢ without WTBS
Community Services Network	1¢
American Educational TV Network	Free
Religious	Free
PTL	Free
Christian Broadcasting	Free
Trinity	Free
National Christian Network	Free
JISAL	Free
COMMERCIAL BROADCAST STATIONS	
WTBS, Atlanta	10¢
WGN, Chicago	10¢
KTVU, Oakland	10¢
WOR, New York	10¢
PAY NETWORKS	
Home Box Office/Take Two (Time, Inc.)	Varies
Showtime/Front Row/Showtime Plus Sports (Viacom-Teleprompter)	Varies
The Movie Channel (Warner Comm.)	Varies
Home Theatre Network	Varies
Galavision	Varies
AUDIO SERVICES	
WFMT, Chicago	1¢
Music Preview Network	Pays cable sys. 1¢
Disco Network	1¢
Cable Tele-Music	Rev. Sharing
National Classical Network	N/A
DATA SERVICES	
Cabletext™	Varies
Reuters	$10 home/$650 bus.

absorb the cost of satellite distribution in order that the product, the advertising, or both, receive as broad exposure as possible.

The services supported by both operator payment and advertising include superstations (in this case the advertising is sold by the broadcast station), sports, news, and a variety of entertainment services. In most cases the operator pays a monthly per-subscriber fee ranging from 5 to 20 cents. This fee generally supports the cost of satellite distribution. Programming costs are meant to be covered by the sale of national advertising. Examples of such services include Madison Square Garden, Entertainment and Sports Programming Network (ESPN), Thursday Night Baseball, and New Prime Time.

There are also several services which are, theoretically at least, supported only by operator payments. These include Cable Satellite Public Affairs Network (C-SPAN), UPI Newswire, and the children's channels Calliope and Nickelodeon. At this stage, the operator per-subscriber payment offsets distribution costs. Direct programming costs either do not exist—as in the case of C-SPAN, which provides live coverage of the proceedings from the floor of the U.S. House of Representatives—or are absorbed by the packager/distributor. Greater revenue can be expected, of course, as the number of subscribers increases and most satellite services actively market their offerings to cable systems.

These methods of supporting satellite services are relatively new and are likely to be refined over time. Some packagers—New Prime Time, for example—plan per-subscriber charges in the early years, until the service is established; then it will be fully advertiser supported. Other packagers are talking about paying the cable operator to carry the service. Spanish International Network plans to compensate systems in proportion to the number of Hispanic-surnamed subscribers. Some satellite syndicators lease satellite time directly from satellite carriers; others sublease excess capacity from larger syndicators.

The other important aspect of these new services is how they have affected the configuration of and marketing of service packages at the local level. The idea of tiering—of providing different levels of service at different prices—actually preceded the development of satellite services. Previously, all cable services (with the exception of the early pay cable ventures) were offered as one basic package, at one price. However, operators began to realize that penetration and revenue levels might be increased by offering dif-

ferent levels of service—a basic reception service, for example, at a lower rate, with extra services added at higher rates.

The key to this new marketing concept was larger channel capacity and the availability of additional services. The important thing was to get the consumer to subscribe even at the lower rate. More often than not, of course, the subscriber would "buy up," or move to the more expensive service.

That this tiering approach has caught on is evidenced in the proposals now being made in franchising. Cable operators are offering two, three and even four tiers of service ranging in price from a stripped-down basic service of automated information channels for $2.95 to a full service multitiered basic and pay service at prices ranging from $20 to $30.

Franchising and Structural Change

Two additional aspects of the present cable environment are renewed franchising activity in the nation's larger markets, and structural changes in the industry. The first major franchising push in cable television came in the early 1970s and focused primarily on medium-sized cities where, under the FCC's regulations, it appeared cable could be successful. This franchising activity slackened after most of the viable markets had been won by one company or another, and also because of a general decline in economic conditions. Some large cable companies were actually barred by the terms of financing arrangements with major lenders from seeking new franchises.

However, franchise competition in the nation's largest cities began to increase in the late 1970s. Industry economic conditions and the financial performance of major companies improved, consolidation within the industry and the entry of new corporate entities with large cash reserves increased, and the success of pay cable, as well as the prospect of further deregulation, led the industry to believe that cable service in major cities could be viable. There is also a feeling within the industry that the current franchising round may be the last one—that after two to four years of franchising in the early 1980s no franchises of any consequence will be left. The result has been feverish competition for franchises in the major markets: Houston, Minneapolis, Pittsburgh, Louisville, Tucson, Cincinnati, Indianapolis, Philadelphia, and others. Franchising, perhaps the only real area of competition within the cable industry, has led

many companies to propose building highly sophisticated cable systems. Companies attempt to out-do one another with proposals for 52-channel or larger systems, promises of multiple origination studios, access channels, two-way services, and other features.

It is also significant that the cable industry is involved simultaneously in increasing consolidation and diversification. Consolidation has been present in the industry from its earliest days. During the early 1970s, however, Justice Department opposition to a proposed merger between two of the larger MSOs, Cox Cable Communications and American Television and Communications Corp., cast a chill over other prospective mergers. The Justice Department's opposition was based not on the size of the merger, but on the fact that the merger would reduce competition for franchises. In the past 3 years, however, consolidation has increased. Cox Broadcasting acquired the outstanding stock of Cox Cable, and in turn General Electric has proposed acquisition of Cox Broadcasting. American Express has acquired half of Warner Cable Corp., and a new entity, Warner Amex Cable Communications, Inc., was formed. Communications Properties, Inc., then the eighth-largest company, was acquired by Times-Mirror, Inc., owner of the 26th largest cable company, but also a major publisher. Time, Inc., which owned Manhattan Cable TV, one of the largest cable systems in the country, merged with American Television and Communications Corp. (ATC), at that time one of the top 5 cable companies. Most financial analysts expect this consolidation to continue as major corporations seek to enter the cable business, and as cable companies themselves attempt to build up their resources for entry into the major markets.

Less noticeable has been the increase in the past three years in the sale of single systems to both medium-sized and large cable companies. Because high interest rates particularly strap the small independent cable operator and because the value of cable systems is at an all-time high, many traditional cable operators have decided to sell out to larger companies.

Diversification within the cable industry is not surprising in view of the fact that much of the cable industry is owned by other media interests. (See Table 4-F.) However, this diversification has reached beyond the traditional newspaper-broadcast-cable ties. Companies like Teleprompter and Viacom have moved into program production and distribution with Showtime. Time, Inc., the owner of ATC, also owns Home Box Office. Cable companies have also entered the Multipoint Distribution Service (MDS) and subscription television (STV) field. Some companies have also set up

Table 4-F Ownership of Cable Systems*
Systems with any degree of cross-ownership are counted. Systems with ownership in more than one category are counted in each.

CATEGORY	SYSTEMS	%
Broadcaster	1,216	30.4
Newspaper	506	12.7
Book or Magazine Publisher	431	10.8
Program Producer or Distributor	701	17.5
Theater	162	4.1
Telephone	74	1.9
Community or Subscriber	101	2.5
Cable or Broadcast Equipment	213	5.3

*As of September 1, 1978, there were 3,997 operating cable systems.
Source: 1979 *Television Factbook*, p. 83-a.

divisions to work in related areas. Warner, for example, has entered the home security business; ATC has set up its own construction division.

Projections

Cable television's prospects have never been brighter, as even the more conservative analysts of telecommunications seem to agree. Media and cable financial analysts predict continued strong growth and increased revenues for the industry.

A recent study by Drexel Burnham Lambert, Inc. predicted that the cable industry will double its subscriber base by 1985, and that half of those 30 million subscribers will be receiving pay cable service by then.[11] Cable penetration will be in the 30 to 35 percent range, according to the study. Drexel Burnham sees cable and pay cable revenues approaching $5.5 billion by 1985, and projects that advertising revenues might boost that figure by another 10 percent.

A 1979 study by the investment firm of Donaldson, Lufkin & Jenrette notes:

> The cable television industry is in the early stages of the most massive expansion in its 30-year history. The increasing success of pay-cable has changed the economics of developing the nation's largest markets, where industry penetration is the lowest. We believe the stepped-up

[11]John S. Reidy, *Evolution of the Media in the 1980s*, Drexel Burnham Lambert, Inc., September 1979, pp. 93, 102.

construction, increased pay penetration, and growing revenues per home suggest a minimum industry growth rate of 20 percent a year for the foreseeable future, and that many of the major cable companies will do better than that.[12]

Paul Kagan Associates, a long-time observer of and authority on the cable and pay industries, predicts 35.6 million cable subscribers by the end of 1985, a total of 86.9 million homes passed, and nearly 19 million pay cable subscribers.[13] He estimates total cable and pay revenues to reach nearly $6 billion in 1985.

Kagan has even offered projections as far out as 1990. By then, he estimates, there will be 47.5 million cable subscribers, just over 80 million homes passed, and 25.4 million pay cable subscribers. By the end of the decade total basic and pay cable revenues should be approaching $8 billion.

Cable prognostication traditionally has been over-optimistic or, less often, overly cautious, depending upon the economic, regulatory or operational circumstances dominating at the time. For example, the 1972 cable rules opening the major markets to limited development resulted in a number of wildly optimistic predictions for industry growth. On the other hand, many observers underestimated the significance of satellite distribution and pay cable (combined with key regulatory changes) in the mid-1970s.

Service Developments

Most industry leaders believe the next five years in cable will be dominated not only by franchising activity but also by service development and refinement.

Service development is likely to involve two general areas: a refinement and sorting out of present and planned satellite program services and gradual development of nonvideo or nonentertainment services.

The satellite program services have emerged with extraordinary rapidity. In 1975–76 Home Box Office and Ted Turner's Atlanta superstation WTCG (now WTBS) opened the floodgate. Five years later, nearly three dozen distinct satellite services were being delivered or planned (see Table 4-E).

[12]Donaldson, Lufkin & Jenrette, *supra*, p. 1.

[13]*Cablecast*, Paul Kagan Associates, November 16, 1979. (See *Appendix A*, Table A-1.)

To some extent this flood of services has outpaced the cable industry's ability to deal with it. The cable operator must decide which services to take. He must decide how they should be configured and priced as part of the local service.

The answers may differ from system to system and depend on many variables—marketing strategies, channel capacity, franchise terms, the system's stage of development and basic penetration, the nature of the programming, which satellite is being used, and many other factors. These answers may also change over time.

It seems safe to assume that a great deal of attention will be devoted to these questions over the next several years and that the mere availability of a satellite service will not mean that it is used by the cable industry. Some cable operators believe, for example, that it may be a mistake to load too many satellite services on the basic cable service. Others argue the opposite, that this is what cable is all about—a delivery system for many different specialized and narrow appeal services.

At the same time it is likely that change and refinement will also take place among the satellite program distributors. Some distributors, particularly those not well capitalized, may falter, disappear or be absorbed by other distributors. Many are essentially packagers assembling product from wherever it is available. Over time they may face a product shortage. Others like Turner's Cable News Network, the New Prime Time and Black Entertainment Television are entering virgin territory.

Unless the cost of these services is passed on to cable subscribers through direct support as in pay cable, or through advertising support, it is unlikely that they will be able to survive. Key to the success of some of these satellite services is advertising.

For some time it has been believed that when CATV penetration reaches 30 percent of the population, cable will become a viable advertising medium. (It was at the 30 percent level that television turned the corner with national advertisers.) Advertisers have followed cable development since the late 1960s. But until recently most advertising dollars in cable have come through ads in local programming—particularly in larger cable systems in such cities as San Diego and New York. As recently as 1978 total cable ad revenues were estimated to be under $5 million, an infinitessimal amount when compared to gross industry revenues of $1.5 billion. The development of a potential national audience through satellite networking and demographic targeting via specialized channels, how-

ever, appears finally to have stimulated major advertisers to look more seriously at cable. Most of this activity is experimental, and does not yet represent a major plunge by advertisers. Bristol-Myers recently concluded a 10-year, $25 million arrangement with Cable News Network to obtain exclusive sponsorship of CNN health-science segments. Bristol-Myers will receive a 30-second commercial repeated 40 times per week. ESPN obtained a one-year, $1.4 million contract with Anheuser-Busch to advertise on its sports channel.

Warner-Lambert Co. has advertised Shick razors on Madison Square Garden Sports Network for more than a year; and such companies as General Electric, Kellogg Co., and Milton Bradley Co. have also entered cable advertising.

What is not yet known is whether, or when, cable advertising will have enough impact to encourage major advertisers to divert broadcast or print ad dollars to cable. Many of the satellite distributors are banking on that eventuality.

Cable executives believe that while a winnowing out and experimentation with cable services is taking place, the next significant step will be development of cable security services. Computer controlled cable security systems providing fire, intrusion, assault, and medical emergency protection require activated two-way capability. For that reason alone, security services will not sweep through the cable industry overnight. Nevertheless, virtually all large cable companies seeking franchises claim they will provide security systems, and many existing systems are examining the concept. Tocom, Inc., a leading supplier, has marketed a system for several years which would be operated by the cable operator as an additional cable service. Warner Security Systems, a Warner Communications Corp. subsidiary, has also entered the field. Cable security services are now offered in CATV systems in Dayton and Columbus, Ohio; Syracuse, New York; and Fort Lee, New Jersey, as well as in Canada. Security service is marketed to cable subscribers at a separate monthly charge in the $10 to $20 range.

Cable security service may be operated directly by the cable operator, or the cable system could contract with an established security firm to provide the service. Some cable operators seem to favor the latter approach since security service requires different marketing and operational expertise from that normally associated with cable television.

Tocom, Inc. has projected a $200 million market for cable security service by 1985. Today the residential security market remains highly fragmented and it is estimated that fewer than 2 per-

cent of American homes are equipped with burglar/fire alarm devices.[14]

Two-way subscriber response services, typified by Warner Cable's Columbus, Ohio QUBE system, are also likely to develop slowly. Warner, for example, has agreed to provide this capability—which can be used for per-program pay services, polling, shopping, and many other services—in some but not all of the new systems it is proposing.

Two-way cable development could lead to such services as electronic mail, electronic funds transfer, energy load management, home shopping, computer time sharing, viewdata services, teleconferencing, and high-speed business data services.

Because of a combination of factors—satellite distribution capability, channel capacity limitations, and technical advances—it is possible that one-way cable information retrieval services may develop sooner and to a greater extent than more sophisticated and expensive two-way systems. Satellite Syndicated Systems, the firm that distributes WTBS and other cable services, plans to introduce a Cabletext™ service sometime in 1980. One attractive aspect of cable teletext is the opportunity to "stack" automated services (weather and stock reports, program schedules, etc.) on a single channel, thus freeing up channels for other applications. Initially, the SSS Cabletext™ service may include delivery of UPI and Reuters news.

Technical Developments

To appreciate both the limitations and potential of cable television, it is helpful to understand basic system design characteristics and how advancing technology is changing cable. A cable system is composed of three major elements: the antenna and headend complex, the distribution plant, and the subscriber terminal. The antenna and headend receive and process signals, and also control or address other information to be sent out to subscribers. Distribution plant includes cable and amplifiers. Trunk cable is the major distribution artery, feeder cable is typically run down a street off the main trunk, and drop cable is run from feeder cable into the home. Amplifiers are installed in trunk and feeder cable to boost signal power.[15] The third element of a cable system is the subscriber

[14]*Cable TV Security*, Paul Kagan Associates, February 12, 1980, p. 2.

[15]Electronic signals weaken as they proceed over coaxial cable; hence, the need for amplifiers. However, as amplifiers boost the signal they create noise. Thus there are limits on how many amplifiers can be used and how closely they can be spaced.

terminal, that is, the TV receiver or a converter attached to the receiver.

There are several important technical developments in cable television. First, the antenna/headend configuration of many cable systems now has a new dimension—the small receive-only earth station—which has had a major impact on CATV operations. No longer are cable operators limited to off-air reception of signals or microwave importation. Yet, while these small earth stations serve adequately for the reception of video programs, it is also recognized that small, low-cost earth stations have a narrow performance margin depending upon technical design, location, the satellites and transponders from which they are receiving signals, and other factors. How much technical advances will improve small earth station capabilities remains to be seen. At this point, however, they do not provide the range of capabilities 10-meter or larger antennas can offer. For example, it is questionable whether one of these earth stations could be used effectively in connection with the PBS DATE system. A related concern to some cable engineers is the wide range of technical and transmission standards used by the various satellite distributors. Efforts are now underway to reach industry-wide agreement on standards.

Another important consideration is the possibility of multiple earth stations serving a cable system. This already exists in a few places and the practice may grow. Chiefly this depends on which satellites are used for cable services. Now, virtually all cable earth stations are oriented to RCA satellites. Some cable operators have also expressed strong interest in installing TORUS-type antennas able to receive multiple signals from different satellites, and others have expressed interest in uplink capability. Today, virtually all uplink capability related to cable services rests with carriers, resale carriers, or satellite distributors like C-SPAN, Cable News Network, and the religious broadcasters.

Of more direct short-term concern is the question of CATV channel capacity. Today the great majority of cable systems are limited to 12-channel capacity. This situation primarily results not from the capacity of coaxial cable,[16] but the television set. Since coaxial cable does not transmit on the UHF frequencies, the cable subscriber can only receive signals on the 12 VHF channels. There are several ways to resolve this problem. One approach is to install

[16]Most coaxial cable is capable of transmission across a 3-300 MHz range. Thus, 35 (technically 38) channels are possible. Several companies have recently introduced 400 MHz cable capable of transmitting 52 or more channels.

2 drop cables and a switching device. This allows the subscriber to receive 24 channels, 12 on each cable. The more common approach is to install converters. Converters simply replace the TV set channel selector. A variety of converters is available to the cable industry. With a newly announced model converter, the home set will be able to receive up to 52 channels. Simple converters cost as little as $20. At one time it was common for fully loaded 12-channel systems to add a single channel converter to introduce a premium service. The cable subscriber couldn't get the service unless he had the converter. Converters/decoders, as we discuss later, also provide a means of security, or control over what the subscriber receives. Most new cable systems use multi-channel converters increasing channel capacity from 20 to 35 channels. Small systems often employ inexpensive block converters which allow them to add up to seven mid-band channels.

Another key technical area concerns the prospects for development of 2-way cable systems. Two-way cable has been actively discussed for the better part of a decade, and 2-way tests have been conducted at systems in such places as Reading, Pennsylvania; Rockford, Illinois; Spartanburg, South Carolina; El Segundo and Los Gatos, California; Orlando, Florida; Irving, Texas; Reston, Virginia, and elsewhere. The viability of 2-way operations was vastly overestimated in the early seventies and most cable operators pulled back from 2-way. However, the publicity surrounding the QUBE experiment and the re-emergence of franchising has brought 2-way to the fore again.

Broadly speaking, there are two approaches to achieving 2-way cable: 2-way operations over a single cable and 2-way via dual cable.[17] In the first approach, a portion of the bandwidth is turned over to downstream signals, those to the subscriber, and the remainder is used for upstream capability. Typical configurations involve 16 upstream and 23 downstream channels, or four upstream and 35 downstream channels. Two-way via single cable requires additional amplifiers and electronic filters. The second approach is to run dual cable, one for upstream and one for downstream operation.

The other important component of 2-way systems is the home terminal, usually a keypad-type device which allows digital response to a computer at the headend. The most common 2-way operations are referred to as *subscriber response systems*. They

[17]When a cable system is first constructed the cable operator may choose to provide 2-way capability in all of the distribution plant or only a portion of it. It has become common to install cable without the necessary electronics to make it actively 2-way.

permit polling, home shopping, remote sensing or security services. QUBE is an example. *Subscriber initiated systems*, like those tested in Reston, Virginia and Irvine, California, permit computer-assisted instruction, viewdata, and other on-demand services. More sophisticated 2-way services like switched video may ultimately be possible.

One important recent development has been the willingness of cable operators to provide institutional 2-way systems—in actuality a separate cable to interconnect a number of institutions—in larger markets. In effect, these are closed-circuit systems which, by virtue of the limited number of users, hold great promise for 2-way institutional video, data services and the like.

Technical developments involving security and control over services provided to subscribers is also a key concern of the cable industry. This is because of the need to provide security of premium services, and also to be able to provide different levels of service to different subscribers. Security and control can be achieved through the use of "traps," passive devices which are connected to subscriber connections and block out a signal, or through converter/decoders which descramble a signal which has been scrambled at the headend. (Some converters also contain remote control and keylock devices.)

The increase in the number of cable systems providing multiple tiers of programming appears to be leading to the development of fully addressable converters—converters addressed by electronic command from the headend. Such converters and associated headend equipment would create the possibility of computerized multitier billing, headend control of each home terminal, scrambling and descrambling capability, and per-program, as opposed to per-channel selection capability. Such addressable converters would also be adaptable to videotext and other services. The cost of these converter/decoders remains quite high, in the neighborhood of $125, but most cable operators believe they will play a major role in cable in the future.

Yet another technical development with important long-term ramifications is the application of optical fiber transmission to cable television. Optical fiber offers a number of advantages over conventional coaxial cable including greater capacity, even immunity to electromagnetic interference and ultimately lower cost. To date the cable industry has been cautious about converting to optical fiber given the technology's relatively early state of development and maintenance problems. Fiber is used in some CATV systems for

headend to studio links, and earth station links. Some cable executives feel that fiber will be used most extensively for trunk distribution. Ultimately, some cable engineers claim, the application of fiber optics to CATV will change systems to fully switched networks in which subscribers can call up one of perhaps 100 channels from the cable headend without the need of an in-home converter.

Uncertainty About Cable's Future

Despite the current buoyant mood in the cable industry, some uncertainty exists as to cable's prospects over the next decade.

In the regulatory area the major questions have to do with the common carrier issue, antitrust issues, copyright matters, and several pending or possible FCC proceedings. The common carrier issue has been with the industry virtually from the start. The nub of the issue is whether because of cable's status as a natural local monopoly it ought to be considered and regulated as a common carrier. If the industry were to be regulated in such a manner, presumably it would be barred from providing any service other than distribution of services offered by others. The history of the common carrier/separations issue is long and tortuous. To the extent that the FCC's 1972 rules imposed a version of common carrier regulation, they have been struck down by the courts. The former Office of Telecommunications Policy in the White House once proposed limited carrier status, permitting cable operators to control a certain number of channels, but requiring cable to provide access to others. Some policymakers remain convinced that common carrier status will be necessary when cable is fully developed and industry leaders acknowledge this possibility. An effort to impose such status nationally could only result from Congressional action, though, and there is no immediate prospect of any such move.

Of more concern is the possibility of antitrust action as the industry becomes increasingly consolidated and vertically integrated. In 1979, prompted by motion picture interests, the Justice Department undertook an investigation of Home Box Office. No action has resulted, however. A related concern is the possibility of FCC rules limiting the size of cable companies. In the early 1970s, the Commission considered rules limiting the number of subscribers or systems one company could control, but never took any action. At least one Commissioner is now urging cable ownership limitations, however. Rule changes now under consideration at the FCC which would wipe

out a limitation on the amount of franchise fees (now 3 to 5 percent of subscriber revenues) municipalities could seek from cable companies is also of concern to the cable industry, but probably would not constitute a major setback.

The two regulatory or legislative actions which cable operators fear the most are imposition of program retransmission consent requirements and changes permitting competition from the telephone company. NTIA has vigorously pursued the argument that in return for abolition of signal carriage and exclusivity rules, cable operators should be required to obtain consent from broadcasters before retransmitting a distant signal.[18] NTIA would continue the status quo for the existing industry, since it feels that the most important impact of the change would be in the major markets. NTIA has been supported by broadcasters and copyright owners who wish to have the cable copyright issue reopened. The cable industry remains convinced that retransmission consent would be administratively impossible and that in any event Congress has already spoken on the cable copyright question in the 1976 Copyright Act by providing for a copyright tribunal that would collect fees from cable companies and distribute them to the copyright owners. Retransmission consent is at issue in pending proceedings at the FCC, although most observers think it is unlikely that the Commission would try to impose such a requirement. More likely is an increase in cable copyright payments through Congressional action or increases in fees by the Copyright Royalty Tribunal following easing of signal carriage and exclusivity rules.

For the time being, concern over cable competition with the telephone industry has subsided because common carrier legislation now under consideration in Congress appears to satisfy most of the cable industry's objections.[19]

Another uncertainty involves the potential competitive threat to cable of home video services, as well as subscription television, MDS and direct broadcast satellite pay TV services. Most analysts do not believe that any appreciable impact will be felt before the

[18]See, for example, Comments of National Telecommunications and Information Administration, *In the Matter of Cable Television Syndicated Program Exclusivity Rules*, Docket 20988, RM-2721, September 17, 1979.

[19]Recent drafts of the Telecommunications Act of 1980 now being considered in Congress would bar AT&T or its subsidiaries from offering cable television service, cable television programming, or any mass media service or product. The legislation would also permit the FCC to continue existing CATV/telephone company cross-ownership rules.

mid-1980s. What may be of most concern is the effect of home video on product supply to pay cable. Some analysts also speculate that extensive and rapid development of STV in urban markets may slow cable development there. Cable entrepreneurs argue that single-channel STV technology is only "prepping" the market for cable. In general, assuming no major disruptions in product supply, cable seems well able to handle competition from the new technologies.

Perhaps of more consequence are the difficulties faced by cable companies in wiring and marketing services in the nation's largest cities. There are several factors at play. One is simply the sheer magnitude of the job of bringing cable to cities like Dallas, Chicago, Boston, Pittsburgh, and the unfranchised areas of New York City. The cost of building a cable system in such cities could be in the $50 to $100 million range, or even more. In many urban areas the cable must be laid in underground conduits (rather than strung from telephone or other utility poles), a factor that can increase per-mile construction costs from $5,000 to $50,000 or more. Moreover, city officials have negotiated franchises that may be far more costly to cable operators than those negotiated in the early 1970s in smaller cities. While most cable entrepreneurs believe that pay cable services will "sell" cable in the large markets, others wonder if pay services alone can make cable profitable in areas where entertainment alternatives are far more copious. Another factor is the serious shortage of both labor and equipment necessary to build these markets. The accelerated construction pace in the larger markets, coupled with the need to rebuild many existing systems, has placed a great strain on cable equipment manufacturers. Many equipment orders are backlogged and some cable companies have begun stockpiling equipment. Some cable manufacturers have only just recently recovered from financial difficulties of the early 1970s when cable construction went into a "bust" cycle. Labor shortages have led some companies to form their own construction companies.

How well the industry handles major market development in view of these factors remains to be seen. A debacle like that of the early 1970s is unlikely, but delays and increased costs may well result.

Cable and Public Television

In large measure, relationships between public broadcasters and cable operators over the years have been much like those between commercial broadcasting and cable. Some public broadcasters have

feared that cable growth would result in audience fragmentation and consequent diminution of local financial support for their stations. This concern has most often been expressed when a cable system proposed importing a distant major market public television station into an area served by a smaller public station. Although typically public broadcasters have objected to such importation, the FCC has usually permitted it in view that public interest considerations outweigh speculation about potential loss of audience and funding. More recently the public broadcasting community has become concerned over competition for programming between public television and cable or pay cable networks and the possible dislocation of traditional public broadcasting fare to CATV.

At the same time public television and the public in general have clearly benefited by cable carriage of both local and distant public television signals. Cable carriage of local signals has provided many UHF stations parity with VHF signals, particularly in outlying areas where cable penetration is highest and UHF reception problems are typically most severe.

A forthcoming study by NTIA will provide new data indicating the importance of cable carriage to public television.[20] While the extent of equalization of UHF signals is still not known, the NTIA study shows that virtually all of the nations's 4,100 cable systems carry at least one public television signal. Further, the study estimates that as many as seven million Americans, or over 2.5 million households, not within reach of an over-the-air public TV signal, do receive public television via cable carriage. This cable carriage (as well as translator carriage) leads NTIA to estimate that about 90 percent of the population now receives a public television signal and that over the next 5 years it is reasonable to project that 95 percent of the population will have access to public television.

In addition, some public broadcasters have for a number of years worked closely with cable operators to develop mutually beneficial arrangements. Typically, these have involved agreements to utilize local cable channels for alternative delivery. KPBS, San Diego, and KSPS, Spokane, for example, have utilized cable channels for delivery of educational and other programs and services. The Corporation for Public Broadcasting has funded demonstration projects or planning studies involving cable use in Spokane, Washington; Madison, Wisconsin; Atlanta, Georgia; Denver, Colorado;

[20]Interview with Brooks Leffler, Director of Planning, Public Telecommunications Facilities Program, NTIA, February, 1980.

San Diego, California; Knoxville, Tennessee; Rome, Georgia; Toledo, Ohio; Los Angeles, California; Wichita, Kansas; Seattle, Washington; Miami, Florida; and for statewide services in Massachusetts and Nebraska. NTIA's Public Telecommunications Facilities Program (PTFP) has also made planning or operational grants to public telecommunications entities designed to facilitate use of cable television. These demonstrations and other activities undertaken by the national public broadcasting organizations appear to have stimulated much greater interest by public broadcasters in cooperative cable projects.

We believe that the time is at hand for significant efforts to develop the public television-cable connection. New franchise development and re-franchising will be dominant concerns in the cable industry over the next 5 years. Past experience demonstrates that the opportunity to develop stable, business-like arrangements with cable operators can be greatly facilitated by well-planned involvement in the franchising process. Increased CATV channel capacity and system sophistication in the major markets also creates new opportunities. The development of the new PBS tripartite programming service and shifting program and product exploitation trends suggest that the time is ripe for new initiatives. Finally, in an era of proliferating satellite services and increased local cable programming services, there will be a strong demand for original production. Product replenishment remains one of the major clouds on the horizon of the new satellite services. The multiple access and local origination channels now being planned in new large market systems open up additional opportunities.

The purpose of our investigation of cable television and public television was not to attempt to detail the many service opportunities and other cooperative arrangements possible between the two industries. We do not think there is a national strategy for taking advantage of the opportunities made possible by cable's development. Cable development has not been uniform, nor is it likely to become so. Systems have varying technical and service capacities. They may operate under differing regulatory mandates. They have varying ownership and financing structures. These factors suggest that the real challenge of cable involvement is a local one. That is where service needs and opportunities can be most clearly recognized. Cable is not a piece of expensive technology to be seized, developed and exploited by public television. It is a service and industry with its own characteristics, dynamics, and imperatives. With an understanding of those characteristics and dynamics and

with sound planning, public broadcasters can realize the important opportunities cable offers.

In addition to the PACE proposal described in Part I, 5 broad areas deserve attention: extension of service, use of cable channels for alternative delivery, co-production, facilities sharing, and cable ownership.

Extension of Service

While the goal of extending public television service to nearly all of the population seems to be within reach, it is also likely that as much as 5 percent of the population may not be able to receive service from an over-the-air station or through cable importation. Primarily this coverage gap is in rural areas. The idea of reaching these rural communities through satellite-fed translators, mini-stations, or cable systems, has received considerable attention in the past few years. Chiefly, the stumbling blocks have been financial, regulatory, technical and, in some cases, a question of program rights. The technical and regulatory barriers are beginning to fall. The FCC has recently authorized satellite-fed translator operations, and has made it easier for telephone companies to provide cable service in low density rural areas. The declining cost of receive-only earth terminals and improvements in translator technology are also positive signs. What remains to be accomplished are the methods of financing local distribution facilities and resolution of program rights and copyright questions. Both NTIA and CPB are currently studying the financing questions and PBS has begun to focus on the remaining program rights questions. Several talent union contracts permit distribution of public television programs by commercial television stations (on a sustaining basis) where no local PBS affiliate exists or even via cable systems. Given the relatively small number of people to be reached, the rights question should not remain a significant barrier for very long.

The effect of elimination of CATV signal carriage rules, now under consideration at the FCC, remains unclear. Elimination of mandatory carriage rules probably will not appreciably affect CATV carriage of local public television signals. However, it is possible that the combination of channel capacity limitations in many cable systems and the availability of more services via satellite may result in some curtailment of multiple public television signal carriage by cable operators. Absent imposition of some type of program retransmission consent requirement, the deregulation of signal carriage may

well result in new marketplace developments with respect to signal or program importation, and public broadcasters should remain alert to developments in this area.

There has been recent discussion about the establishment of a public television superstation. In effect some stations like KCET, Los Angeles; KUED, Salt Lake City; KERA, Dallas; KRMA, Denver; and WGBH, Boston, and several others have already become regional superstations by virtue of extensive terrestrial importation of their signals by CATV. Virtually all public television service in Montana and Wyoming, for example, results from importation of the Salt Lake City or Denver signals. Perhaps the single most attractive aspect of such a superstation would be the side-stepping of program rights problems since the signal would constitute a distant signal "secondary transmission." While superstation status might be quite valuable to the station itself in view of cable copyright revenues and an enlarged fund-raising base, unless that station were to alter its program schedule in the manner of a commercial independent or specialty station—that is, to provide a significantly different service—there would not appear to be great public benefits flowing from the service. If large numbers of Americans had no access to any public television service and little immediate prospect of such access, the situation might be different. However, in view of NTIA's recent study, that seems not to be the case. Public television superstations, as presently conceived, appear to be a concept in search of a rationale.

Alternate Delivery

Use of cable channels for alternative delivery is receiving increased attention because of the reorganization of the PBS program service and the perceived need for multiple sources of local distribution. In the past, cable origination ventures have typically resulted from dedication of a specific channel (or portion of a channel) pursuant to a franchise, leasing arrangements, or other contractual agreement. Public television distribution has also been associated with use of access channels or channels dedicated to local educational institutions, which in some cases is the public television licensee. In both ways cable channels have been used to deliver specialized services or programs ranging from in-school instruction, general educational programming repeats, professional accreditation courses, adult education and the like. The major barriers to development of this concept have been securing the use of CATV channels and obtaining copy-

right clearances and program rights for cable exhibition. The ability of public broadcasters to obtain access to cable systems varies widely. Some have reported successful recent negotiations with cable companies; others have found cable systems with virtually no excess capacity or reluctant to commit to dedicating channels. The most successful instances appear to result from arrangements established in franchise agreements, or the negotiation of a long-term business arrangement where the cable operator has become convinced that the programming or service to be delivered will be valued by at least a significant minority of cable subscribers. Another key factor has been the ability to obtain a fully dedicated channel or channels, rather than depending on access channels subject to competing time demands.

As discussed earlier in this report, the copyright and rights issues appear to pose an even more formidable barrier. This is because of the administrative difficulties associated with obtaining copyright clearances for distribution of programs over cable and because, in the case of most PBS programming, standard broadcast rights do not include cable exhibition. PBS has only begun to focus on this problem, but it is clear that before widespread use of cable channels for primary distribution of PBS national programs, these questions must be resolved in negotiations.

Co-Production

An area which has received less attention is the development of local or state co-production arrangements between public broadcasters and cable operators. The prospects and potential for cable/public television co-production ventures at the state and local level deserve attention for several reasons. On a system-wide basis, a considerable amount of local public affairs and general interest programming is already being produced by public broadcasters. Some of this programming may be of more than local interest and some, of course, can be used many times. If additional sources of funding could be tapped, more and different types of local or regional programming would be possible. At the same time, new large capacity cable systems being franchised in large- and medium-sized cities are offering to provide considerably more local origination capability than has previously been the case, and some are committing to the establishment of programming budgets. Some cable companies may find it to their own advantage to help finance production for

secondary release on cable, acquire such programming, or enter into cooperative arrangements for regular services. A logical example would be coverage of local governmental activities or state legislatures. Several public television stations already provide such service. In the past, cable operators have generally been unwilling to help support such programming, since they didn't need it and they were not accustomed to paying for programming. The satellite services and pay cable have begun to change those traditional attitudes.

Demand for public television product may also develop in the expanding marketplace of satellite-delivered "basic" cable services. The Cable News Network, which must fill 24 hours of airtime with network quality material, could well be interested in segments from such public television staples as "The MacNeil/Lehrer Report," "Washington Week," "Wall Street Week," "Nova," "World," or hearing coverage, or even material from the Daily Exchange Feed. The same thinking could apply to other special interest satellite services. "Over Easy" segments would be a natural for the New Prime Time programming services aimed at the audience aged 50 and older. Some children's shows might benefit by multiple exposure on Nickelodeon or Calliope.

Several issues would have to be resolved. For example, some of the services are advertiser supported. Copyright clearances and union negotiations would be necessary. The manner of release would have to take into consideration the potential diminished value of the product to consuming PTV stations. However, in time, as program distribution practices change and as the marketplace gives rise to new ventures, this concept or a variation of it could well prove feasible.

Facilities Sharing

Another area of future cable/public television cooperation concerns the prospects for facilities sharing. The Carnegie Commission endorsed this concept as a means to minimize capital investment, as well as maintenance and replacement costs, and to enhance service delivery and flexibility. Formal or informal sharing opportunities are most apparent in connection with satellite earth terminals and with local interconnection facilities. The FCC routinely permits noncommercial sharing of earth stations.[21] The full ramifications of the

[21] *First Report and Order*, Common Carrier Docket No. 78-374, October 18, 1979.

Commission's approval of the PBS/Western Union commercial sharing arrangement are not yet clear, although this decision appears to provide public broadcasters significant new flexibility in utilizing satellite facilities. A number of cable/satellite/public broadcasting sharing configurations have already been tested. In several cases a cable system earth station has been interconnected with public television facilities via wire or microwave to facilitate program delivery. Interconnection of public television earth stations with cable headends has also been tried on an *ad hoc* basis. Opportunities for sharing facilities are also present through interconnection of cable systems on a regional or state-wide basis. Several state public television networks are examining this option. There are a number of instances where established CATV microwave networks or public television microwave might be used to the advantage of both public television and the cable industry.

Ownership

Another option receiving attention from some public broadcasters is direct entry into the cable television business through acquisition of cable systems or competition for cable franchises. The interest stems from the desire to establish new revenue sources, to increase service flexibility, or both. We think cable ownership should be approached with great caution. Cable acquisitions might seem attractive as a source of revenues, but given the highly inflated prices of CATV systems in today's market,[22] the expertise needed to operate systems, and the tax questions involved, we think the attraction is illusory.

Franchise development may be more attractive since obtaining a franchise "costs" considerably less. However, the costs and expertise associated with building, operating and marketing a modern cable system are far greater and the tax advantages associated with cable system start-up seem to offer little advantage for a nonprofit public broadcasting operation.

Obtaining a limited equity position in a cable franchise, particularly in a station's service area (which would require a cross-ownership waiver) would appear to be the most realistic cable ownership option. However, in general we believe that the energies

[22]Today, a cable system might be worth over $500 per subscriber, compared with less than $300 only 5 years ago. Donaldson, Lufkin & Jenrette, *supra*, p. 39.

of public broadcasters would be better spent on the service opportunities available from cable development.

In sum, we believe that the key ingredients to successful development of the opportunities available through cable are local initiative and planning, a sound understanding of the dynamics of the cable business, realistic objectives, involvement in the franchising and refranchising process where possible, and the development of a business-like arrangement with cable operators.

CHAPTER FIVE

Pay Television

Overview

The principal result of our research and analysis has been a proposed new pay cable network for the performing arts, culture and entertainment called PACE. Part I and *Appendix A* provide a description, a rationale, and the financial details necessary for decision-makers to determine the pros and cons of the basic concept.

PACE was conceived in the context of this industry report about the recent upsurge in the pay television business, which principally involves cable and broadcast delivery. Less viable modes such as microwave distribution and the as yet undeveloped direct satellite-to-home broadcast concept proposed by Comsat, are also elements in the pay television picture of the next decade.

Each of these businesses rests upon a fundamental shift in the television business that occurred in the 1970s—the viability of programming services based upon direct consumer payment.

The financial success of pay television via cable resulted from changes in regulatory policy and the launching of satellites that made low cost networking possible. Other delivery systems also began to flourish, bringing more and more competitors into the field.

As the 1980s unfold, we find that over 6 million U.S. households, out of some 75 million, are plugged into one or another of these new pay television services, with prospects for as many as 28 percent of all homes by 1989. At a per-home monthly charge ranging from $8 to $25, such consumer acceptance generates very considerable revenues. As these pay systems grow and spread across the country, it also becomes possible for services with different programming orientations to evolve. These economic facts underlie the proposal for PACE.

Prior to or in lieu of such a major commitment to pay television, many other options remain for public television. In order to evaluate these options, it is necessary to examine the sectors of the pay industry as it has evolved to date, to understand the role of regulation, the interrelationships among the major firms now jockeying for a share of the lucrative markets, and to explore some probable trends in programming, networking, and business strategy. This industry report presents such an analysis.

Summary of Recommendations for Public Television

Short of the launching of PACE described in Part I, there are other possibilities for public television in pay television, which are examined in the last section of this chapter. The chapter recommends that:

- The production capacity of public television will be of possible use to pay networks. Public television may offer existing programs to pay television companies, arrange for prior or simultaneous release of programs, or co-produce. All of these will help amass new funds for public television programming, but each raises significant problems of program rights, limitations on the use of public television facilities, and PBS system policy.
- Public television duopolies and stations in markets served by more than one station should examine the possibility of leasing their stations for a part of the day to a commercial STV programmer. This would require FCC approval, and, in our view, should not be done unless the money generated is specifically set aside for public television programming purposes.
- Public television should continue to explore with Comsat the possibility of programming one of the channels on the proposed satellite-to-home pay system.

Historical Development

Although the Federal Communications Commission was petitioned as early as 1952 for authorization to operate a subscription broadcasting service, the pay TV industry did not become a viable business until the mid-1970s.

Following a change in FCC regulatory policy toward pay television, in large part due to court rulings, the industry has ex-

perienced stunning growth. Consumers have responded in large numbers during the late 1970s to the opportunity to pay for one or more entertainment programming services delivered by various means to their home television screens.

Today there are three principal methods for delivery of pay TV to the home: cable television, broadcast TV, and omni-directional microwave systems. Other techniques used in the past include the telephone system, dedicated coaxial cables, and microwave links. Future delivery methods will include direct broadcast to the home via satellite and optical fiber transmission networks.

Cable television has been the most extensively used delivery system for pay TV and remains today the dominant sector of the industry. Pay TV service has become the most attractive draw for the potential new cable customer and the foundation for cable's future growth into markets previously seen as unprofitable.

Since cable television is neither a broadcast nor common carrier service, the medium was something of an anomaly for federal regulators. Their response, as detailed in Part II, Chapter 4, was to restrain it first from even being built in major markets, and then, as a result of rules promulgated in the early 1970s, only on terms which limited the types of programs that could be offered for pay by cable systems.

A few cable operators, nonetheless, began offering pay channels to their customers in the early 1970s, experimenting with a variety of organizational and technical arrangements to launch the business. Some cable operators went directly to Hollywood and made deals for product. They programmed their own pay channels, feeding them with film cassettes loaded into a tape machine at the headend. (Now rare, such a system is known as a "stand-alone.") Other operators contracted with a middleman or booking agent to negotiate for the programming and assumed only the local marketing and transmitting functions. Bookers like Cinemerica or Telemation Program Services licensed product and "bicycled" videotapes to local affiliates. Another approach was taken by Optical Systems, which leased a channel from the cable operator, then functioned as an autonomous pay TV service, programming, marketing, installing, and maintaining equipment.

The technique that proved to be most cost efficient and pioneered the new industry was pay TV networking. Home Box Office, the best known and by far the largest network, was launched in 1972 at Sterling Manhattan Cable Television. Both companies are owned by Time, Inc. HBO packaged the programming much the same as

the other booking agents, but realized economies and service benefits by distributing over microwave, rather than bicycling videotapes. When HBO moved the service to satellite distribution in 1975, it paved the way for later pay networks to reach cable systems. Thus Showtime, an HBO competitor, now jointly owned by two large cable operators, Viacom and Teleprompter, switched from tape to satellite in early 1978. Warner Cable's Star Channel, now called The Movie Channel, did the same a year later in order to market the service more effectively to cable systems other than those owned by Warner itself. Few pay cable subscribers now receive a service that is not satellite delivered.

Today there are over 2,000 cable systems offering one or more pay TV services. Of 35 million homes passed by cable at the end of 1979, 16 million were subscribers. Of those, 5.3 million took the pay option, which routinely costs an additional $8 to $10.

The second largest number of pay TV subscribers are now served by means of a specialized broadcasting system called *subscription television*, or STV. The medium is at once the oldest and the newest of the three current delivery techniques. The use of over-the-air broadcast frequencies for subscription service has been sought almost since commercial TV began more than 30 years ago, but the first nonexperimental STV station began operation only on March 1, 1977, in Newark, New Jersey. (The FCC had authorized an STV experiment in Hartford, Connecticut in the 1960s. Other trials were attempted in California and Oklahoma.)

Several different technical systems are employed in today's STV systems, but they all do basically the same thing. They scramble the subscription portion of the station's programming—generally in the prime time hours—so that only viewers with a specially installed decoder can receive an ungarbled signal. STV subscribers can be billed on a per-channel or per-program basis, depending upon the equipment employed.

By early 1980, 8 UHF broadcasting stations were providing STV service to nearly 400,000 subscribers; another 7 stations were authorized in February 1980 and are expected to launch service within a year. STV service costs an average of $18 per month, which is comparable to the basic cable rate plus the charge for one pay cable channel.

Typical STV fare is similar to HBO's or Showtime's: movies, specials, and sports. The STV licensee, however, unlike the pay cable operator, is a broadcaster regulated by the FCC and is subject to the same rules governing any commercial broadcaster. Only a

portion of the day can be devoted to the pay programming; the remainder is for advertiser-supported programming. Unlike the national pay cable services, STV's nonmovie fare tends to be more locally oriented, featuring sports from within the market, and other tailored product. To date, STV stations have neither interconnected nor affiliated with the national pay cable networks. HBO does have a department that markets some product to STV stations, but it does not currently have plans to use one of its satellite transponders for STV networking.

Even though STV is a more locally programmed medium than pay cable, not all STV licensees actually perform the programming function themselves. Some firms choose to contract out some or all of the responsibilities for program acquisition, operations, marketing, equipment installation, and maintenance. The licensee, however, must maintain operation of the nonpay portion of the broadcast air.

The third system of pay TV delivery is called *multi-point distribution service*, or MDS. Authorized by the FCC in 1962, this service was not intended as an entertainment programming vehicle at all. The Commission saw the service primarily as a means of transmitting business data and educational and training materials.

In 1970, upon petition from an equipment manufacturer, the Commission increased the bandwidth of a single MDS channel to 6 MHz, enabling transmission of color television, and applicants with programming plans began filing for licenses. MDS service was different from previous microwave systems, which are used to relay signals from one transmitter to another in linear sequence. MDS radiates the signal 25–30 miles in all directions, much like broadcasting transmitters, permitting a large number of receiving points in the coverage area.

The technology was ideal for distributing motion pictures and other pay TV fare from one central point to hotels, apartment buildings and offices. MDS, in fact, initially competed with other early delivery of pay TV services to hotels via coaxial cables, phone connections, or direct microwave links distributing programs from a central point to the buildings' Master Antenna (MATV) systems.

MDS differs from STV in several ways. The MDS licensee is a communications common carrier, not a regulated broadcaster, and as such must lease time on its facilities on a first come, first served basis without discrimination and at rates filed and regulated by the FCC. Therefore, MDS licensees theoretically have no role in determining the service offered over their facilities. It is their customers that select the service. (In fact, however, the categorization of MDS

as a common carrier is an anomaly because so much MDS time is booked in bulk to operators of pay TV service.) MDS pay franchisees can be the same entities programming STV and pay cable in the same or other markets. By far the majority of the 44 MDS stations operating by November, 1979 provided their subscribers with HBO or Showtime.[1]

Table 5-A shows the history of pay TV population in the U.S.

The three delivery systems are or will be competing head-to-head in many markets, each with distinct advantages and disadvantages.

STV has immediate and marketwide coverage when service is initiated in a community and therefore can add subscribers as fast as installers can get to them. But STV only offers a single channel of service. Its start-up costs are quite high,[2] and licensees are required to maintain normal broadcast operation as specified by the FCC.

MDS is the cheapest system to launch[3] and to operate, but power limitations severely curtail its reach. In addition, the MDS signal requires line-of-sight transmission. Terrain, buildings, even foliage can rule out service to some areas. All of these factors limit the size of the potential market. In addition, MDS, like STV, offers only one channel of service. (Two MDS channels may be authorized per market, but each requires separate equipment for reception and cannot be licensed to the same owner.) Because the MDS technology is so limited, the total number of potential subscribers is far less than STV or cable, and most observers do not expect it to be a large or long-term portion of the pay TV business.

Cable has the advantages of multiple channels and improved signal reception. Most industry observers believe it to be the strongest competitor in any head-on match. However, cable construction costs are very high, the franchising and building process is protracted, and it is not economically viable to lay cable in sparsely populated areas. Until the revenue per subscriber increased so dramatically with the spread of pay cable, construction in the urban centers was not considered a good investment.

Now, however, the bidding is frenzied for the remaining major urban franchises as cable operators see time and markets running

[1]Source: 1979 *MDS Databook*. (Paul Kagan Associates.)

[2]The ON-TV operation in Los Angeles, first to turn a profit, required a total investment of $11 million.

[3]Arthur Lipper, Chairman of Microband, the MDS industry leader, speaking at the 1979 NCTA Convention, estimated a start-up cost of $500,000 in the typical market.

Table 5-A Pay TV Subscriber History* (in millions)

DATE	PAY-CABLE SUBS	MDS SUBS	STV SUBS	TOTAL PAY SUBS	BASIC CABLE SUBS	HOMES PASSED BY CABLE	HOMES PASSED BY MDS	HOMES PASSED BY STV	(a) TOTAL HOMES PASSED
4/1/73	.018			.018					
7/15/73	.035			.035					
2/1/74	.048			.048					
5/15/74	.067			.067					
9/1/74	.100			.100					
12/31/74	.140			.140					
3/31/75	.189			.189					
6/30/75	.265			.265					
9/30/75	.351			.351					
12/31/75	.469			.469	1.984	4.216			
3/31/76	.633	.024		.657	2.530	5.550	.111		5.661
6/30/76	.766	.028		.794	3.150	6.874	.134		7.008
12/31/76	.978	.043		1.021	4.370	9.191	.192		9.383
6/30/77	1.174	.065	.005	1.244	5.202	10.779	.305	.135	11.219
12/31/77	1.642	.071	.020	1.733	6.483	13.432	.371	.392	14.195
6/30/78	2.352	.091	.059	2.502	7.591	15.363	.457	1.500	17.320
12/31/78	3.289	.146	.145	3.580	9.397	18.338	.750	5.500	24.588
6/30/79	4.334	.207	.260	4.801	11.487	21.777	2.317	6.700	30.794

DATE	PAY-CABLE % PEN OF HOMES PASSED	PAY-CABLE % PEN OF BASIC CABLE	MDS PAY % PEN OF HOMES PASSED	STV PAY % PEN OF HOMES PASSED	(b) AVERAGE PAY-CABLE RATE	(b) AVERAGE MDS RATE	(b) AVERAGE STV RATE	(b) AVERAGE PAY TV RATE
12/31/75	11.1	23.6			7.85			
3/31/76	11.8	25.0	21.6		7.49			
6/30/76	11.5	24.3	20.8		7.59			
12/31/76	11.1	22.3	22.3		7.87	10.01		
6/30/77	11.5	22.5	21.3	3.7	7.81	10.39	14.98	7.97
12/31/77	12.9	25.3	19.1	5.1	7.92	10.69	15.48	8.12
6/30/78	16.2	30.9	19.9	3.9	7.94	11.69	16.26	8.27
12/31/78	19.5	35.0	19.4	2.6	8.09	11.63	17.85	8.62
6/30/79	19.9	37.7	9.0	3.9	8.20	11.94	18.36	8.91

*Paul Kagan Associates, Inc., *The Pay TV Census*, June 30, 1979, unpaginated.

(a) Total homes passed includes some overlap due to CATV, MDS and STV systems competing in the same market.

(b) Average rates are determined by dividing revenues from all subscribers by the number of subscribers.

out. At the same time, STV and MDS competitors keep a steady pressure on the FCC for faster processing of applications and further deregulation.

Who gets to which market first will be an important factor in the short and long term viability of the competing technologies. Whether MDS, or even STV, prove only to be stalking horses for the more versatile cable service remains to be seen. Some areas are still unlikely to be cabled any time soon because of the high cost of wiring, and these will remain, at least temporarily, good markets for MDS and/or STV. Moreover, if STV grows rapidly and becomes profitable, it is likely that new programming networks will evolve that are strong enough in their own right to survive the competition from cable and the new challenge of direct satellite broadcast pay services.

The Comsat Proposal. The issues of regulatory action, speed of market entry, and single- vs. multi-channel pay services are all raised by the announcement of a proposed direct broadcast satellite-to-home service (DBS) by the Communications Satellite Corporation (Comsat). Heretofore, satellites have only been used as conduits for distributing television signals between and among broadcasters, cable systems, phone companies, and networks for further distribution to the ultimate consumer. Comsat, as a communications common carrier, is a wholesaler of satellite services.

The new Comsat proposal would be quite a different use of satellites and would be a new role for Comsat as a retailer to the public of pay TV services. Although the plan has not been submitted to the FCC at this writing, it has been explained in outline by Comsat officials. Two new high-powered high frequency satellites would be launched to beam up to six TV signals across most of the continental U.S. Because the satellite would be considerably stronger in transmission power, the receiving dishes could be much smaller, and in mass production, promise to be vastly cheaper than those typically used by the cable industry.

Comsat estimates the cost of these receiving dishes is expected to be approximately $200 to $300 once production is in full swing. Costs will be affected by progress in other countries like Japan and Canada, which are testing DBS. The consumer would pay approximately $20 to $25 per month for the basic service, which would offer an HBO-type movie channel, regionalized sports package, and other entertainment and/or educational programs. The cost of the receiving dish would be amortized into the monthly subscription charge.

Assuming it can overcome the considerable hurdles of obtaining FCC and perhaps Congressional approval, Comsat estimates a launch date of no sooner than late 1984 and commencement of service sometime in 1985.

The DBS technology could easily knock STV and MDS out of the marketplace: it offers more abundant programming at about the same price, simultaneously transmitted nationwide. Since Comsat has entered into an arrangement on the project with retailing giant Sears, Roebuck & Company, the service can be expected to be marketed vigorously around the country.

Whether DBS could compete directly in communities with heavy cable penetration is another matter. But Comsat officials believe that several subscription services may co-exist; large areas of the country will remain uncabled and too small to sustain an STV or MDS system, and in such communities the DBS system would be ideal. It is the universal coverage of DBS that is its greatest asset, and Comsat believes a nationwide market of five to ten million subscribers is not an unreasonable expectation for the service.

Regulation and the Growth of New Networks

Factors like technology, consumer demand, and corporate strategies have each played a role in the growth of the new pay television services. But before these forces could be unleashed, several important regulatory developments were necessary.

The first had to do with authorization of subscription broadcasting. Zenith Radio Corporation filed a petition in 1952 requesting authorization for an STV system it had tested called "Phonevision," which used telephone lines to activate service. Pressure from other manufacturers prompted a 1955 *Notice of Rulemaking*, 20 Fed. Reg. 988 (1955), asking for comments regarding the FCC's jurisdiction and other matters of law, and questions of factual data, as well as overall public interest considerations. In May 1957, the Commission issued a *First Report and Order*, 23 FCC 532, declaring its statutory jurisdiction to authorize STV, but indicating that a market test would be necessary to determine the economic and policy impact of the service.

Between 1957 and 1959 the FCC issued three STV reports leading to the authorization of an experimental operation by Zenith in Hartford, Connecticut. (An experiment in California by former NBC executive Pat Weaver was thwarted with a public relations campaign by broadcasters and theater owners to "save free TV.") In

1965 Zenith petitioned the FCC to establish permanent national STV based on the Hartford operation. Such authorization was granted in the Commission's *Fourth Report and Order on Subscription Television,* 15 FCC 2d 466 (1968) subject to six policies. All but one (#2 below) are still in force today.[4] They are:

1. The so-called "complement of four" rule stipulated that only markets with four existing Grade A commercial signals are permitted to operate STV on a fifth channel. 15 FCC 2d at 529.
2. The "one to a community rule," i.e., no more than one STV authorization will be issued to any "community." 15 FCC 2d at 531.
3. A requirement that stations authorized to offer STV must continue to program a minimum number of "free" hours. 15 FCC 2d at 526.
4. Both UHF and VHF licensees would be eligible to apply for STV authorization, although it was seen as unlikely that the latter would do so. 15 FCC 2d at 527.
5. That no one technical system would be authorized, and that the marketplace would, at least for the time being, be permitted to encourage technological development. 15 FCC 2d at 535-536.
6. That STV operators would be required to lease decoding equipment to subscribers, rather than sell it outright. 15 FCC 2d at 552.

The Commission did not limit the ability of STV licensees and franchisees to acquire and distribute programs, as they had the commercial networks. It did, however, adopt a set of "anti-siphoning rules" designed to prevent STV from outbidding "free TV." STV could not carry advertising, broadcast feature films over 2 years old (with several exceptions), broadcast sports which had been regularly broadcast live on free TV in the two years prior to proposed STV exhibition, broadcast series programs, or schedule more than 90 percent of total airtime with movies and/or sports.

At that time the FCC delayed deciding whether cable systems should be forced to carry the scrambled STV signal, a decision it has yet to make.

[4]The National Association of Theatre Owners failed in a court challenge to the FCC go-ahead on STV. The rules, and the FCC's authority to issue them, were endorsed by the courts and constitute the basis for today's STV business.

The anti-siphoning rules adopted for STV were soon extended to pay cable, *Memorandum Opinion and Order on CATV*, 23 FCC 2d 825 (1970). The cable version was struck down in *HBO v. FCC*, 567 F.2d 9 (D.C. Cir. 1977) cert. den. 434 U.S. 829 (1977). In 1977 the FCC removed STV movie restrictions, and in 1978 the remainder of the anti-siphoning rules, so that both pay cable and STV could acquire programs and compete for customers.

Thus, over a period of nearly 30 years, the evolving FCC policy toward pay television had finally arrived at the point where entrepreneurs using various technologies would not be restricted in the kinds of programs they could offer subscribers.

The 1977 *Notice of Inquiry and Notice of Proposed Rulemaking* in Docket 21502, 67 FCC 2d 202, and its *First Report and Order* 46 RR2d 460 (1979) were additional steps for STV. The Commission lifted the one-to-a-community rule, proclaiming that the result would be greater use of UHF, not harm to existing "free TV." Competing STV stations may now operate in any community with four other existing Grade A commercial signals. The complement-of-four rule is itself expected to be dropped in a new round of deregulation.

Pay delivery via MDS was made possible, as we have noted, only because the FCC expanded that frequency allocation in order to accommodate color television transmission. The Commission also decl[illegible]d to regulate certain aspects of MDS ownership, and did not extend anti-siphoning rules to that medium. These actions enabled the business to gain its small foothold.

FCC action in the late 1970s also paved the way for rapid creation of new national programming networks. HBO's 1975 initiation of satellite distribution created the infrastructure for dozens of additional cable networks. The 1976 decision to authorize small, receive-only satellite dishes was critical because it lowered considerably the cost of joining a network or satellite-delivered programs.[5]

The fact that HBO selected RCA's Satcom as its vehicle also meant that RCA had a substantial business advantage. By facing Satcom in order to join the HBO network, cable operators turned their backs on competing satellites. To reach these cable outlets,

[5]In the years since that decision, monthly volume of earth station sales has increased tenfold, according to Scientific Atlanta, the industry's largest supplier. Of the 1,299 dishes now aimed at HBO's transponders, for instance, only 125 are of the early ten-meter variety.

other programmers were required to seek space on the RCA satellites. Thus, the so-called superstations, other pay networks, and all cable's other satellite-delivered services are carried by RCA's various "birds."

Regulatory policy will continue to have an important impact on the direction of new programming services, networks, and the structure of these businesses. Among the important issues pending are mandatory carriage of STV scrambled signals on cable systems, authorization of direct broadcast satellite service, administration of copyright law, telephone company entry into the cable business, and Justice Department attention to the vertically integrated pay TV business.

The Structure of Pay Cable

The major functions to be performed in the pay TV business are: hardware manufacture, program production, distribution, technical interconnection, local exhibition (split between licensee and franchisee in some cases), and related sales and service functions.

As we have noted, there is considerable integration of function within each of the different pay modes, as well as among different portions of competing modes. Cable operators, program distributors, and program producers are corporate siblings: Time, Inc.'s ATC, HBO and Time/Life Films; Viacom's pay TV syndication arm and half-ownership (with Teleprompter) of Showtime; Warner Communications's Warner Amex Cable, Warner Amex Satellite Entertainment Corporation and Warner Bros. Films. Hardware manufacturers are also STV and MDS licensees and franchisees (Oak; Blonder-Tongue). Single companies are in cable, STV and MDS (Wometco). Programmers are involved in STV and MDS (Tandem Productions) and in program exhibition and distribution (Hollywood Home Theater, owned by United Artists and Twentieth Century-Fox, which are also part owners of PRISM, a regional pay cable network). Many other examples can be cited, and new combinations will continue to emerge.

A pay cable service is a triangular relationship among the *exhibitor* (the cable operator), the *producer* (movie studios, sports suppliers) and the pay TV *distributor* (pay cable network).

Revenues are split among these three entities with each responsible for various functions necessary to make the system work. The local cable operator must market, service, install, and promote

his service. The producers produce. The network helps promote the package it has designed and keeps it supplied with programs it creates or acquires.

Today the split of revenues among the three sectors of the business is estimated[6] to be:

Exhibitor	-	60%
Producer	-	25%
Distributor	-	15%

Earlier concepts of the pay business assumed that the pay distributor would operate the service and market it directly to the consumer. This original concept would have divided revenues 50 percent (producer), 40 percent (distributor) and 10 percent (exhibitor).[7] Things worked out differently, though, as a result of negotiations with the cable industry.

The cable operator's (exhibitor's) share became much larger as a result of the fact that he, as operator of the cable system, was the partner in closest touch with paying customers. The pattern was established in HBO's early contracts, which provided cable affiliates a 20-25 percent slice of the revenue off the top to service and maintain the necessary equipment. By 1975, the split had become 59 percent (exhibitor), 30 percent (producer), 11 percent (distributor).[8]

These ratios change as the industry grows and as the various sectors and companies in the business gain a competitive advantage. The cable operator continues to have the greatest asset—the customer. The split that has been most volatile is that between the Hollywood program suppliers and the pay networks, especially HBO.

The newest entities in the pay cable structure are the pay networks. Movie companies and cable operators all pre-date the founding of HBO, the industry's first network. What follows is a survey of the major pay cable networks.

Home Box Office, the largest, was launched in 1972 and began satellite service in 1975. A wholly-owned subsidiary of Time, Inc.,

[6]*Pay TV Newsletter*, July 5, 1978. It should be noted that the Hollywood studios disputed these figures, claiming their portion is closer to 15 percent, and the distributors' share closer to 25 percent. Since neither party permits close examination of its books, the estimates cannot be proven.

[7]*Pay TV Newsletter*, June 26, 1975, p. 1.

[8]*Ibid.*

HBO now beams a signal to over 4 million subscribers on over 1,700 systems in 50 states, Puerto Rico and the Virgin Islands. HBO is carried on MDS channels as well, and so far supplies one STV system. HBO's per-subscriber revenue ranges from $3.25 to over $4.50, depending on the system's subscriber charge. Discounts are offered for volume or performance (market penetration). Programming is 60 percent movies, with 24 to 27 new items per month. The package also includes its own sports programming, and an increasing number of exclusive specials and series—an anticipated 90 new shows in 1980. It programs six-to-eight hours per day on two RCA transponders, aimed at east and west time zones. HBO began offering the *Take 2* "mini" pay TV service in April 1979. It consists of "family-oriented" G- and PG-rated motion pictures, no sports, and selected specials. The price is typically $4 to $6 for consumers, rather than the $8 to $10 for the full HBO service.

Showtime was introduced by Viacom, International, a major TV syndicator and the nation's seventh largest MSO, in September 1976. It moved to satellite delivery in March 1978, and became a joint venture of Viacom and Teleprompter, now the largest MSO, in September 1978. Showtime serves over one million subscribers on 600 systems in 46 states, making it the second largest pay network. Showtime has been programmed in much the same fashion as HBO in the past, although with considerably less emphasis on sports. It currently provides about 18 premieres—mostly films—each month. Due to increased competition, Showtime recently announced it would step up its own original production to six or seven shows monthly by year end and extend its program day from eight to 12 or 14 hours per day. Per-subscriber revenue ranges from $3.12 to $5.60 per month, again varying by system size and subscriber fees, but subscribers generally pay $9 to $11. Showtime also offers a $2.95 to $5.95 mini-package called *Front Row*.

The Movie Channel was born in 1973 as Star Channel. It is marketed by a subsidiary of Warner Communications, in a joint venture with the American Express Company. This company, Warner-Amex Satellite Communications Corporation, distributes The Movie Channel and a satellite-delivered basic cable service called Nickelodeon. Warner announced in 1978 that Star Channel, previously carried only by Warner-owned cable systems, would go on the satellite in March 1979, and be marketed to other systems. Revamped since than as a 24-hour-per-day movies-only service, it is marketed both as competitor and complement to HBO and Showtime. Its target is systems offering a second or third pay TV option,

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which has now become a trend in the industry. Its per-subscriber revenue is a flat $3.75 per subscriber per month.

Home Theatre Network is a mini-pay-TV service offering family fare with G and PG ratings. On average, consumers pay about $3.95 per month; affiliates are charged $2 plus a percentage of subscriber fees above $5. Home Theatre Network serves about 40,000 homes in over 60 systems, generally as a second pay tier.

Galavision is a satellite-delivered pay service launched in October 1979, offering Spanish-language films and specials. It serves about 3,000 subscribers in nine systems and expects 15 to 20 new affiliates before June 1980. Subscribers pay fees ranging from $6.95 to $10.95 per month. Generally, Galavision collects 50 percent of the monthly fee in service charges, with volume discounts available to systems delivering 2,000 or more takers.

Rounding out the pay TV universe are the nonsatellite services, which account for about 9 percent of total pay cable subscribers. The largest among them is PRISM, a microwave-delivered sports/movie package tailored to the Philadelphia region. Its success in holding its own in markets shared with HBO or Showtime—by far the bulk of its affiliates—helped give rise to the current enthusiasm for offering more than one pay channel on the same cable system.

PRISM's films are booked by Hollywood Home Theatre, first and only offspring of the desire of movie studios, in this case Twentieth Century Fox and United Artists, to run a no-middleman pay TV business. Hollywood Home Theatre has a small number of other affiliates, among them SelecTV, one of the STV operations serving Los Angeles.

HHT's booking function mirrors Telemation Program Services (TPS), now an HBO subsidiary. At the time it was sold to HBO, TPS was the second largest supplier of programming to the pay industry. It exists now largely as a stalking horse for HBO, though its still marketable ability to tailor programming to special community tastes was the network's guide to setting up its new STV booking division, HBO Program Services.

UPTOWN and BRAVO, products respectively of Teleprompter-Manhattan and Daniels Properties (recently sold to Newhouse Broadcasting) are local "macho" channels. Their acceptance in markets also served by other pay services has prompted much discussion. But so far there has been no introduction of a national satellite-delivered action/adventure channel.

Other bookers of pay TV product include Telemine, Bestvision, Optical Systems, and Cinemerica.

The Structure of MDS and STV

Each of the three sectors of the pay TV industry is organized somewhat differently. While there are some important differences between STV and MDS, the two share a greater likelihood of continuing structural realignment than cable does. STV, with only 8 operating systems, will probably change as it adds new cities, subscribers, and revenues. MDS, in the face of competition from STV and cable, is the least likely to grow, perhaps even to survive, as a pay delivery service. In addition, both face unsettled questions at the FCC that could affect their future structure. What follows is a description of the present form of each industry and the forces that may alter them in the future.

There are three components to STV: the station *licensee*, the *STV franchisee* (the entity that leases the station's prime time hours), and the *STV programmer* (the program decisionmaker). In some systems, the last two functions are handled by the same company; in others, the licensee itself is STV franchisee and programmer. Because there is not yet a pattern of networking in STV, middlemen and distributors are not heavily involved in the business. In effect, the role played by the pay cable network is assumed in STV by one or more entities operating in each community. All of them, of course, acquire their programming from the same sources: program producers and suppliers, like the Hollywood studios.

There are also three basic entities in MDS: the *licensee* (the common carrier licensed for the MDS frequencies), *franchisee* (the common carrier's local customer operating the service) and *program distributor* (usually a network as in pay cable). On the local level, a considerable variety of arrangements exists for the marketing of MDS. They vary from the franchisee controlling the entire business, to multiple retailers selling, installing, and billing the service in different parts of the city.

Growth of MDS and STV will be determined by a number of variables. The timing of entry in each community is critical. So, too, are costs. The relative newness of STV makes predictions somewhat difficult. Whether or not it remains the model, the nation's largest STV operation provides the clearest example of how the business is operating today. Known by its trade name "ON-TV," KBSC-TV Channel 52 in Corona, California, is responsible for much of today's excitement about STV.

Operating in the Los Angeles metropolitan area, ON TV serves 250,000 subscribers and has installed at a rate of 2,500 new units per

week. With a potential of three million homes, the station expects to sign up a total of 15 percent, or 450,000, in the next five years. Its projectd annual revenues are more than $50 million per year.[9]

KBSC is licensed to Oak Broadcasting Systems, which is a subsidiary of Oak Industries, the largest manufacturer of descrambling and converter hardware. The franchisee, which also programs the station, is National Subscription TV (NST), a joint venture between Oak Industries and Chartwell Communications. Chartwell is owned by Jerry Perenchio, partner of Norman Lear in Tandem Productions.

The service costs $19.95 per month,[10] plus an installation charge of $39.95 and a $25.00 decoder deposit. Hookup and servicing are handled by NST, Sears Roebuck, and General Electric. Sears also sells the service.

This complex structure for owning and operating the station is not atypical, either in STV or MDS. Each license is handled somewhat differently, and the operations may change as the industry matures.

That growth will probably affect the MDS structure as well. As of November 1979, MDS existed in 44 markets, ranging from New York City to tiny Burlington, Iowa. It has been employed in some areas exclusively for hotels and apartments, and in others almost exclusively for private homes (for example, in Anchorage, Alaska). Some licensees have a thriving business in the lease of MDS time for purposes other than pay—usually business and data services. Many exist entirely to distribute pay TV.

MDS will, in all likelihood, remain a relatively small part of the pay TV business. The companies operating pay services over MDS, many of which are also in STV and cable, may abandon that technology as competition increases. Business users, the MDS licensees themselves, and the FCC may well determine that the technology could better be used for such other purposes as business data transmission.

Future Trends in Pay Television

Still subject to many uncertainties, the industry does seem likely to be profoundly affected by the following trends:

[9] *Broadcasting*, October 1, 1979, p. 23.

[10] ON-TV's system has the capacity for per-program billing, but a 1978 experiment was not repeated.

1. *Antitrust and regulatory action* The Justice Department could revive its antitrust investigation of HBO's and Time, Inc.'s role in various sectors of the cable, MDS, STV, videocassette, TV production, and distribution businesses. The Motion Picture Association of America (MPAA), which sought the original action, or another aggrieved party, could initiate private antitrust action if the government does not act and/or market forces do not loosen Time, Inc.'s control. Other firms involved that are vertically or horizontally integrated could be affected as well. The FCC, too, could initiate proceedings in any or all of these areas extending regulation to pay networks, banning various cross ownership arrangements as they have done with various cable/broadcast/newspaper/phone company combinations.

2. *Further networking* The principal driving force behind networks is the economy of sharing large-scale program investment and the added bargaining power of an enlarged number of viewers. Coupled with cost savings made possible by satellite distribution, it seems virtually inevitable, barring regulatory action, that more and more entities in the pay television business will interconnect as networks. The logical example, as noted, would be for co-owned STV and/or MDS franchises to offer networked programming distributed via satellite. "Ad hoc" networks, such as commercial broadcasting's Operation Prime Time, could also provide a model.

3. *Program origination* We have already noted the upsurge in planned program origination by HBO and Showtime. This is the result of twin forces: the advent of multiple pay offerings in a single community, which forces the networks to begin to differentiate their services, and a desire to gain independence from the major Hollywood studios. It is also a byproduct of substantial profits, and competition for affiliates and new subscribers. If and when any of the major parties (HBO, Showtime, Hollywood studios) reaches agreement with the writers' or directors' guilds, a considerable surge in new product can be expected. Even before then, the pay networks will work hard to uncover new talent and inch toward originality. Evidence of this is Showtime's present commitment to tape legitimate stage productions.

4. *New marketing schemes* 1980 will be the year of many new satellite-delivered cable services, most of them not full-channel pay services. Many cable systems will group attractive basic cable services with a pay channel and offer this new "pay tier" for an added fee. The concept of "pure pay" versus basic cable will be-

come blurred, especially in new markets with many channels, and no previous arrangements to combat. In addition, experimentation with per-program marketing in both cable and STV can be expected as the industry grows.

5. *A limit to new services* Following the surge of new program offerings via satellite, there must come a period of testing. Cable operators are now looking to the ratings services that have announced plans for improving cable audience measurement. This is particularly crucial for those services that intend to rely upon advertising. In addition, the much touted services must prove themselves by some standard of quality; if they fail, some operators may drop them. And, there is the question of capacity—both on cable systems and on the satellites. Already the 12-channel operators have reached their limit. The 20- and 24-channel systems built in the 1960s and 1970s are rapidly being forced to choose among the various distant signals, satellite services and pay channels. How many of the so-called nonpay services, which charge systems on a per-subscriber basis, can they afford to subsidize? If consumers want more, wouldn't more pay channels make sense?

6. *Acquisitions* With the lure of increased profitability, cable systems, pay services, individual satellite services, MDS and STV properties all seem ripe for consolidation and acquisition. The large cable MSO's are cash-rich now and will almost certainly buy more systems, even as they seek to build new ones. Entry by companies like American Express and Dow Jones into the programming business indicates another acquisition trend.

7. *Distribution* As RCA's satellites continue to fill with cable services, cable operators must decide whether to invest in a second or even third receiving dish. New technology will soon make possible reception of three or more signals simultaneously from different satellites. With wide-spread acceptance and cost effectiveness, this technology could open the cable industry to other, nonRCA systems—particularly important to networks like PBS that are now transmitted via Westar.

The convergence of these and other unforeseen trends leads to the conclusion that while pay TV as an industry will undoubtedly grow, it is difficult to predict with precision which entities will enjoy the largest measure of its success. The interaction of technology, regulation, market forces, and consumer demand will combine to create the pay TV world in which public broadcasters find themselves.

Public Television in the World of Pay TV

Public broadcasters, along with their commerical brethren, have been thrust somewhat unwillingly into a new environment of competition and rapid marketplace change. They can only speculate about the impact of the pay services on public television's audiences, fundraising, and program supply. While at first glance PBS might seem the most vulnerable of all existing programming services, it is still too soon to know this from available data.[11] On the contrary, one could imagine that increased channel switching might well bring more audience to PBS. Increased promotion and common program carriage have already helped build ratings.[12] Likewise, it is impossible to analyze the impact of pay TV on fundraising. Because PBS stations are becoming ever more effective at raising voluntary donations, we may never see drastic results directly attributable to pay TV.

Over time, PBS may well detect some negative impacts in audience and fundraising brought about in part by pay television competition for viewers. Another view is that during the 1980s, growth in the number of TV households, as well as increases in the number of hours of viewing time per household will keep pace with the increased number of hours devoted to the alternatives to broadcasting. Public television nearly blankets all U.S. homes and thus starts out with a considerably greater universe than any pay service or cable network.

[11]PBS's statistics determine the cumulative rating for a particular program over the course of a week. Available pay TV viewership data are not comparable. A. C. Nielsen studies of pay TV households in February and May 1979, measured viewing at particular time slots, from which one can learn the relative draw of network broadcast and pay television programs, since networks and pay TV programs are carried at the same time. Furthermore, the Nielsen pay TV study lumps together all PBS signals viewed in the household and thus doesn't differentiate among programs. Despite these discrepancies in measurement methodologies, we can see that PBS programs fed at a particular time did not appear to suffer in the pay cable market. *Masterpiece Theatre* earns 3.1 percent of the U.S. households on a cumulative basis, which may reflect a second showing. In cable homes measured, the "PBS" listing earns a 3 rating and a 4 share.

[12]During November 1980, the first period measured during which nearly all PBS licensees carried four nights of prime time programming at the same time, the ratings were the highest for any fall in its history: 45.6 percent of U.S. households watched PBS during the week of November 5–11, with 23.4 percent in prime time alone—figures that exceed records set in seasons when public television is more heavily viewed than in fall, when competition from and within the commercial networks is most intense.

Nonetheless, we do perceive an important area of competition that has prompted us to explore recommendations for immediate action by public broadcasting—that is, the area of program supply and finance.

Some competition is obvious: the newly announced "BBC in America" service from Time-Life could siphon away some, though probably not much, of the BBC-produced material available to PBS. Satellite delivered cable services for children, senior citizens, minorities, ethnic groups, and the like could conceivably offer attractive terms to producers and suppliers of programs.

These are, however, not yet highly profitable ventures, and will never achieve the kind of revenues that the pay services are seeing. The larger challenge—and opportunity—for public television stations and other producers is the marketplace for programming that has opened up and will continue to expand, as a result of pay television.

What follows is a series of proposals for public television involvement with the pay television marketplace, presented in ascending order of magnitude as to risk, difficulty, and scale. Our major recommendation is the creation of an entirely new, nonprofit pay cable network—PACE—which is detailed in Part I of this study. The following steps can be taken without the creation of PACE, or during the interim before its initiation. Many of the same considerations are involved in PACE as with these other actions. They include:

1. Offering PBS existing programming to pay TV.
2. Selling limited rights for pay TV exhibition of new programming which would subsequently play on public television.
3. Co-producing with existing pay TV networks.
4. Utilizing some stations' prime time for subscription television service.
5. Participating in the Comsat venture for direct satellite service.

1. Existing PBS Program Use On the face of it, offering existing PBS programming for pay cable use would seem relatively simple. However, our analysis indicates that this concept involves all of the major roadblocks that more complex schemes demand, without much likelihood of increasing revenue or expanding the stock of programming for public television—both key goals in the consideration of the pay market.

First of all, pay television executives have made it quite clear that they must premiere television product on their services, except in rare cases. Their customers pay substantial amounts of money for a "premium" service. In addition, the present programming philosophies at HBO and Showtime, the only pay services currently investing substantially in nonmovie product, preclude the vast majority of product ordinarily broadcast on PBS. An early HBO scheduling of "The Pallisers" a British import that did well on PBS, had low HBO viewership. It did not have enough "mass" appeal. This does not necessarily mean future PBS-produced programs of unique quality and appeal will not be sought by the pay networks, or by the aggressive STV marketers.[13]

However, such deals would require three important sets of negotiations: with the copyright holders, the unions, and the full PBS membership for which exclusive broadcast rights are negotiated. Sale of programs with uncomplicated copyright, talent, or release questions might be relatively simple. But the matters of policy and precedent involved are sufficiently complex that it is unlikely that many public television producers would be willing to negotiate without promise of considerable return.

In addition, public television stations must consider the issues raised by the investment of government funds in the facilities used for any pay television activity. Virtually all public television stations are equipped in part with funds provided by the federal government since 1962. Current legislation that authorizes the facilities program at the National Telecommunications and Information Administration (NTIA) of the Department of Commerce explicitly prohibits commercial use of facilities.[14] Thus, a question is inevitably raised about the definition of "commercial" activity.

Recent policy initiatives by NTIA and the FCC have seemed to encourage the kinds of "commercial" activities discussed in this section. The FCC has recently authorized the sharing of satellite ground stations at PBS stations. Henry Geller, Administrator of NTIA, told public broadcasters in November 1979 that they should become involved with pay television and other new technologies.

In pursuing any of the projects we suggest, though, public broadcasters may come into conflict with provisions of the 1978 Public Telecommunications Financing Act and NTIA regulations

[13]Demand for use of PBS product may develop among the satellite delivered cable services, a concept discussed in the cable industry chapter.

[14]47 U.S.C. §§ 392(a)(4), 392(g)(2).

implementing the Act that limit the use of federally financed facilities for the provision of public telecommunications services. The underlying policy involved here, while perfectly understandable and otherwise unassailable, may serve to thwart the larger Congressional goals of greater exploitation of new technologies and development of new funding sources. We suggest that this subject be considered when public telecommunications legislation is revised in 1981.

Broad policy discussions on issues pertaining to program use and rights issues have been underway at PBS for some time, under the direction of the general counsel's office and with a special committee of the licensees. At this writing the principal issues resolved by the committee have related to the terms under which producers of programs funded in part with PBS member funds can be sold in syndication[15] to commercial stations when a PBS outlet chooses not to run the program. PBS policy and some, though not all, union contracts permit exhibition of programs over cable, when a licensee declines to broadcast, if there is no financial transaction. Hence, the suggestion made here would require further alteration of the PBS policy. Central to the issue is the perception of licensees about whether extending use of PBS programs would damage them financially or in the eyes of viewers. Secondarily, the financial split of revenues between PBS, on behalf of consumers, and the producer is a concern. Finally, the cost which may be incurred by talent fees or copyright payments—matters which have yet to be negotiated for this market—would enter into the feasibility of such a project.

Our conclusion about all of these matters is that deals will probably be made on an *ad hoc* basis, and will not be the primary impetus for massive negotiations.

2. *Limited Pay TV Rights Prior to PBS Broadcast* Far more tempting are the prospects of prior or simultaneous release to pay TV of programs licensed from a PBS producer. Pay TV is hungry for programming, because Hollywood output is reasonably small, and because the major pay networks have yet to negotiate union contracts that would permit certain kinds of original product. Thus, new sources of quality programming are courted, provided they meet the programming designs of the respective pay networks.

[15]Several PBS producing stations have sought to sell programs to commercial affiliates. Viacom International, the syndication firm, is marketing "The Best of Brazilian Television," a program which ran first on PBS. Its co-producer is WPBT/Miami. "Dancing Disco," a "how-to" dance program produced by WGBH and financed in the 1979 SPC, was declined by San Francisco's KQED. WGBH sought to sell to an independent station in Oakland, and a lengthy system debate ensued.

Pay network executives are firm about their entertainment objectives. In a recent interview an HBO Programming Vice President, Iris Dugow, elaborated.

> While thousands of proposals cross her desk, Dugow is very specific about the type of show she is looking for. The key word, she says, is "tune-in value," the pay TV equivalent of a box-office draw.
>
> "We've spoiled our audience," she says, rather proudly. "We've given them Barry Manilow, Lily Tomlin . . . they want to see superstars. Our motto is 'Give them what they want.' I'm not interested in what I call 'Grade B' performers. . . .
>
> Dugow's advice to aspiring producers is to read the monthly program guides to see what kinds of programs are being bought.
>
> "A lot of people think this is the new PBS. It's not. If someone sends me a proposal on a show about kangaroo hunting in Australia, I know that person hasn't seriously considered this market."[18]

Public television producing stations and PBS have conducted discussions with HBO and Showtime to determine whether new product might appeal. The lure is obvious: money. With substantial profits and a need for product, these networks are in the position to complete funding on major projects in the PBS pipeline. An example of this situation occurred with WTTW's "Soundstage," which features rock and pop groups in concert. The series, funded in part by stations via the SPC, had an opportunity to sign the highly popular rock group, the Doobie Brothers, but the talent fee overran the budget. By offering a limited "window" to HBO prior to the PBS broadcast, WTTW was able to obtain the services of a major attraction that would have otherwise been beyond its reach. HBO got a first-rate production, which it exhibited repeatedly during a limited period several months prior to the PBS broadcast in October 1979.

Union contracts did not affect this deal, apparently, because the talent, members of both AFTRA and AF of M, were already receiving compensation far above scale.

The only difficulty with the arrangement from a policy perspective is the apparent violation by WTTW of the exclusivity of its SPC contract, which was believed to be more than justified by the signing of a major rock group that PBS could otherwise not have afforded.

Other stations, in off-the-record conversations with the authors, indicated similar desires. Depending upon the nature of the pro-

[18]"Getting a Piece of Pay Cable," *Videography*, December, 1979, p. 35.

gram, the source of nonpay TV funding, and union contracts, we anticipate further arrangements for limited pay TV "windows" in the future. Conflicts will be greater if funding is provided in full, or even in part, by the majority of PBS member stations. If stations' money is not in the program, they will have a hard time objecting to a producer's need to complete funding from whatever source possible. It may be recalled that some licensees in the system objected to corporate underwriting when the practice became widespread. Such complaints have virtually stopped since so many quality programs would otherwise be unavailable.

A separate set of concerns revolves around the participation of the Corporation for Public Broadcasting in funding programs that might also have pay TV money in the funding mix. The current CPB practice of sharing income generated by CPB-funded programs with the producers might need to be reexamined in cases involving license fees from the pay networks.

Another issue might be raised in the pay TV licensing of typical public TV fare because so many programs are partially financed by foundations, government agencies, and corporations that routinely receive an underwriting credit. This will undoubtedly present problems for a pay TV exhibition and would need resolution. In addition, the unions have expressed concern about a prior pay TV exhibition. In cases where there are relatively few actors, musicians, writers, and the like, or when no union contract exists between producer and one or more guilds, pay TV exhibition is possible—as in the case of "Soundstage." However, for elaborate productions involving many actors, musicians, writers, and craft personnel—for instance, a made-for-TV movie—negotiations will certainly be necessary.

Such negotiations are difficult for major producing stations because of two factors. First, no industry-wide pattern for first-run pay TV programming has yet been established among the several major unions. Thus, public stations would be in the position of making precedent-setting deals that might exceed terms that more powerful parties might negotiate. (This is precisely the case with the lone signatory of a DGA pay TV agreement, a small producer called BMR Concepts.) More troublesome, however, is the ripple effect that even bringing up the issue might cause. Were unions to alter their fundamental bargaining position vis à vis public television stations, it could have substantial impact on the price structure of all public TV programming. For this reason, WNET apparently did not bring

up pay TV in its January 1980 negotiations with DGA over broadcast issues. KCET, on the other hand, which signed a DGA contract last summer after taking a strike, has announced its intentions to reopen union discussions on the pay questions. As long as the audience for pay television is limited, unions may find a form of the "step-up" payment appropriate, i.e., an additional payment to union members would be made to cover the pay cable run. This kind of arrangement, however, would still require negotiation, under existing union contract terms.

3. *Co-production* Full co-production between a pay network and a public television producer (either station or independent) escalates the complexity of the issues. For one thing, the concept of co-production implies much more equal editorial involvement on the part of each party. Unless special conditions apply, a co-production would normally mean the pay distributor would be in a position to negotiate much fuller rights, in proportion to investment and might gain equity in the property beyond simply licensing the product for release. Correspondingly, such concessions would normally mean more money than what would be available for a limited exhibition license fee. Such fees would be balanced against the value and nature of the product and the prevailing terms that the pay network obtains for other products.

An independent supplier to PBS with no union contracts would be in a good position to strike such a deal. In such a case, HBO or Showtime would become the first outlet for the product, and would permit subsequent limited exhibition rights to PBS in proportion to the amounts of money provided by each party. PBS, in effect, would be paying the acquisition or licensing fee, and would negotiate terms with the program owner.

Were a major producing station or an organization like Children's Television Workshop to seek co-production with pay cable or STV, there would be two routes open to them. The first would be to target the production exclusively for nonPBS distribution. The second would be to structure an arrangement that permits a sequence of play from pay TV to public television and then to other markets. In the first case, it would appear that no system-wide public television decision would be needed. This would merely be an additional business activity that a private, nonprofit organization undertakes, necessitating its own union negotiations. Stations may find, as well, that such a plan would require the establishment of a profit-making, tax-paying subsidiary. Several stations have such profit-making sub-

sidiaries: WTTW, with its commercial FM radio station, is a prime example.

The second arrangement would necessarily require a new policy, or at least a waiver of existing PBS rights policies regarding exclusivity of product. This deliberation, we believe, is absolutely essential for any further investigation into the pay market. It is far more than a technical question, because it strikes to the heart of the PBS enterprise and its rights philosophy.

Despite the promise of an increased supply of new programming and greater program funds, many public broadcasters worry about the impact of an early release of public television programs on pay television. They cite the erosion of PBS's identity as a distinct service, and adverse impact on the PBS viewership and fundraising, especially among their large donors who might be likely pay cable customers.

We don't believe that those fears are justified, particularly given the relatively small number of pay cable subscribers and the overwhelming need for new sources of programming on public television. A number of PBS programs are not exclusive to that outlet. One category is imported material, some of which has appeared in subsequent syndication on commercial television. The same is true for various movie packages, rights to previously aired CBS documentaries, take-over of certain rejected network programs, including the popular "Cousteau" series, "National Geographic," and "Camera Three." Whatever genuine rationales one might develop to justify this kind of programming, the fundamental basis for this strategy is financial. The practice would, we believe, enrich the storehouse of high quality programming available to public television viewers. We don't advocate that the entire program service be transferred to HBO—indeed, we do not believe that much of the material that has typified PBS schedules in the past would be acceptable to the pay entrepreneurs. But for the selected blockbuster special, or original made-for-TV movie or mini-series with high production costs, elaborate sets, big stars, and high visibility, we do not believe prior exhibition on pay TV would materially damage PBS's competitive situation.

Indeed, there is reason to believe that prior release on pay TV might enhance the property for PBS. Much of the value of movies lies in the reviews, word of mouth, the awards, and the reputation and the advertising associated with a major release. We expect that the pay networks will increase their promotion of first-run pay cable

product in the general press and even on national and local television. Were public television clearly associated with the production, it would share in the critical acclaim.

The major impediment to such a concept is the continuing uncertainty of labor costs and terms. As in past examples, there are few benchmarks yet for the costs of producing original pay TV co-productions. Taking the most extreme example, the producer might be forced to consider the run on pay TV and the subsequent run on public television as if the single program were produced originally for two separate markets. Since the portion of a production budget in public television devoted to labor, talent, and rights typically varies from 15 to 50 percent, one might anticipate substantial "step-up" fees to compensate labor. But since no actual negotiations are underway, we can only speculate: If the program runs first on pay TV, is it subject to full commercial rates? Would there be continuing royalties for talent, even if the release pattern for the pay TV run varied? Would the subsequent talent costs for the PBS run be considered a "step-up" or would 100 percent of current PBS scale apply? What impact would a pay TV run have on the negotiating posture of the unions regarding the current PBS contract provisions and scale?

The answers to these questions will emerge from the give and take of collective bargaining. However, it is safe to say that without some special consideration of the unique problems presented to the PBS noncommercial enterprise by the various guilds, current union signatories in public television will have a difficult time in entering the pay TV marketplace. We suspect that producers will go to the appropriate unions on a case-by-case basis during the current contract period, with a fuller resolution of such issues taking place in negotiations for the next contracts, which will come due over the next three years among the various guilds. By then, the scale of pay TV agreements may be settled among the commercial suppliers, providing at least a benchmark for negotiations by public television.

Finally, it is worth noting that while HBO and Showtime are presently the principal outlets for co-production, as well as other kinds of deals we have been discussing, this is not likely to remain constant for very long. STV, in particular, may produce new programs in the near future.

4. *Entry into Subscription Television* As our description of the over-the-air subscription television business indicates, it is an infant industry subject to great unknowns. Much depends upon the

pace of deregulation at the FCC and the speed with which cities are licensed for STV service, since nobody is entirely certain of the fortunes of STV in a fully competitive marketplace. Thus, the timing for STV—as well as MDS—in each market is critical in a period when the multi-channel pay services from cable and direct broadcasting satellites loom large.

Public television's greatest opportunity in the STV area may come because individual public TV licensees already own existing broadcast stations, the single most valuable component in the STV set-up.

Typically, an STV operator can obtain a license and operate the station that carries subscription television service in prime time. Or the licensee can franchise an outside party to operate the pay service. This arrangement can take many forms, as we have indicated. Clearly, one of the emerging patterns is the leasing of prime-time broadcasting periods by subscription TV companies from local entrepreneurs who either already have an existing commercial TV license, or who are seeking such a license at the FCC.

Theoretically, a public television entity could enter the business in several ways. It could package programming, competing with private corporations like National Subscription TV and Wometco Home Theatre. It could establish a company to seek commercial licenses in prime markets, and then either book the STV service itself or bring in a programmer. Or a public TV licensee could seek authorization from the FCC to utilize a portion of the airtime on a noncommercial station for purposes of marketing an STV service. Of the choices, we believe the third offers significant potential for revenue and service to selected licensees in certain markets.

We have dismissed the first two suggestions as unappealing alternatives for public television. Direct marketing by PBS of the typical STV product—movies, sports, and entertainment—is hardly a nonprofit business. Furthermore, it requires substantial capitalization and bears no discernible relationship to the primary mission of public broadcasting. Most telling, the marketplace is developing so rapidly that it appears doubtful that any public entity could launch such an effort quickly enough to secure contracts with potential customers. The same would probably be true for the notion of securing commercial TV licenses or MDS licenses from the FCC. The competition for these markets is fierce, the costs rising, and we would say the objectives are dubious for public broadcasting, al-

though we would not rule out such moves in a handful of markets that defy generalization.

The second notion—a unique and competitive pay television service to be offered on some public broadcasting stations—does not make economic sense. It is highly unlikely that any conceivable program format not primarily dependent upon uncut motion pictures and sports would attract sufficient paying audiences to justify the expenditures necessary for production and acquisition of the programming and operation of the service. For such a service to succeed, we believe, there needs to be a much larger subscriber base, and that requires mass appeal product and a national market.

We note again that programming produced by public television could find its way onto STV in first- or second-run engagements, but not as a separately marketed program service.

We do find significant opportunities in the STV business, however, for some existing public broadcasting licensees to lease their air time to private STV program packagers. This concept would require several important regulatory changes and appropriate market conditions before we would judge it workable.

Three categories of licensees may be suited for this STV plan. First, in a handful of major markets in the U.S., a single organization holds the licenses of more than one educational broadcasting station covering the same community. In Boston, Minneapolis/St. Paul, San Francisco, Miami, Pittsburgh, and several other cities, peculiarities in the licensing history have permitted so-called "duopolies" to come into being. A proceeding on the duopoly question is currently underway at the FCC, centering on the propriety of permitting such ownership in noncommercial television, while barring it in commercial television. In most cases, the second channel is used to broadcast programs that the station prefers not to run on the main service, as well as for in-school instructional materials, access programming, and other special interest fare. The licensee of the duopoly could seek STV authorization for the second station's prime time hours.

A second category of possible STV outlets might be drawn from the markets in which there are numerous overlapping public television signals not owned by the same licensee. In most of these cases, the licensees each offer distinctive service that emphasizes different types of programming. While we doubt that many of these stations would choose to relinquish prime time for STV service, there may be the exceptional situation that would warrant consider-

ation. For example, if a licensee's main mission is a daytime in-school service, the nighttime might be turned over to STV. Obviously, this would be an individual, station-by-station determination.

A third category might well be the new applicant for an educational television license in an area that is underserved by television of any kind. It may be justified, for instance, to permit some limited STV use of an educational allocation in a sparsely populated area, in order to gain the benefits of daytime, early fringe, and late-night public television programming. This proposal is a particularly good opportunity for groups that include minorities and/or women in positions of control, given the government's current drive to increase such ownership of broadcasting. A variation of the new station idea would be low-power UHF channels, which have been proposed by NTIA and others.

We believe that the concept of reserving for STV a portion of the broadcast day used largely as a rerun service for the main channel may be a wise use of scarce broadcast spectrum. Furthermore, we believe that revenues in some markets from this activity could be as much as $500,000 or more per year. That is enough for at least one major new program series, especially if a number of PBS stations launched the experiment simultaneously and agreed to pool the revenues.

Obviously, competitive business factors would determine the amount of potential revenue. But the risks would be minor to the PTV licensee, and the public policy concerns, it seems to us, easily met.

Our recommendation is that one or more public television licensees, drawn from the categories we have outlined above, seek necessary waivers to the FCC regulations, negotiate contracts with national subscription television operations, and outline a plan for the use of the revenues. This direct use of public broadcasting facilities would also need the administrative approval of the NTIA.

Since STV's principal start-up cost and delay is in the construction of a transmitter, public broadcasters may offer a much more rapid road to the marketplace than the laborious process of starting from scratch. This is particularly important because STV is, in a sense, a race against competing and more abundant technologies.

An essential part of our recommendation is the dedication of the earned revenues to a particular category of program production, as opposed to general revenue for the licensee. As a tradeoff for turning over scarce prime time hours, these stations would commit

themselves to new programming to serve their local and national audiences. The candidates for such programming efforts, it would appear, are those that are most difficult to fund, and which always find their way to the top of the system's "wish" lists: children's programs; high-quality cultural programs by, for and about minorities; domestically-produced drama, news, and public affairs.

The FCC might look favorably upon at least an experimental application of this plan by public broadcasting. We recognize the extent to which this use of an ETV facility varies from the traditional norm. However, such a tradeoff seems more than justified if it would provide new programming. It is in keeping with the general trend of deregulation. It is a marketplace solution to the problems of spectrum allocation. It is a wonderful new source of programming funds in a system constantly in search of discretionary income. And it enhances the diversity of program choices available to the consumer in that market without appreciably lessening the existing options. Another highly attractive feature of the plan is that new resources would be generated without either cluttering the broadcast air of the primary public television service (as is the case with auctions and fundraising pitches), or raising questions about funder influence in program decisions (as has been the case with corporations and government agencies).

5. *Direct Broadcasting Satellite* Farthest in the future for pay television is U.S. direct satellite-to-home broadcasting. While DBS would not necessarily be a subscription service, the current proposal by Comsat is premised upon consumer payments roughly based on the HBO/Showtime model. Comsat's plan calls for several channels for a "basic" service charge with additional pay channels available for additional fees. At least one of the "basic" Comsat channels would be entertainment oriented, HBO-style fare. Another might be more similar to the PACE model we have described in Part I of this report. Other programming that Comsat is considering includes instructional/educational material, sports, and minority taste programs.

Public television could become involved with the Comsat or other possible DBS plans in two ways. First, it could seek to supply programming of various specifications to the new service. This might include direct sales, co-productions, or acquisition of regular PBS fare. The second option would involve a more direct operational role for public television in one or more aspects of the entire DBS system.

The role of program supplier or co-producer with the future DBS operation would not be very much different from that proposed with the current television distribution outlets.

The more immediate prospect involves negotiations with Comsat over a possible public television role in the pre-operational planning phase. Comsat officials have held discussions with PBS, CPB, and some of the stations as to what, if any, function might be performed by the various units of public television. CPB, in particular, has been anxious to cooperate with Comsat in defining an educational orientation to at least part of the proposed DBS program offerings.

The educational thrust—often described as a "university of the air"—might well work on the multi-channel DBS system, but we are not in a position to judge the economic viability of such a concept based upon the limited amount of information that Comsat has released. CPB's position will be further clarified upon the announcement of a new funding source that may be available to help support such an educational use of new technology.[17]

Comsat's principal objective during the next year is to secure regulatory and Congressional approval of specific and detailed plan for the launch and operation of a DBS pay television service. We believe public television system managers should continue to negotiate with Comsat to determine what pre-operational and operational role the system might play in DBS.

We do not believe such negotiations need to discourage public television's parallel activities in other pay television businesses, particularly the launching of the PACE pay cable network. Indeed, because of the relatively distant time frame of direct satellite broadcasting, many of the results of PACE, or of the more interim steps described in this chapter, could provide models for program production and distribution arrangements that could be wholly transferred to a newer system like DBS.

The point is not to exclude any technology, per se, merely because public television has entered other competing markets. Just as it should not let its role in broadcasting hinder consideration of cable or STV, so too should the system adopt a flexible negotiating posture and an open mind toward direct satellite broadcasting and other systems that come along.

[17]CPB has confirmed negotiations with the Annenberg Foundation, which is interested in supplying a reported sum of $150 million to be used in innovative educational telecommunications projects. The Internal Revenue Service must rule on the appropriateness of the plan, so that no formal action had taken place by CPB or Annenberg at this writing.

Conclusions

These several recommendations and the discussions that accompany them are not designed to be the definitive word on public television's possible entry into pay television delivery systems. They represent, in our view, a range of steps that various units within public television might well explore in the face of a growing and influential market.

We believe that most of these steps, however, are ancillary to public television's primary broadcast service. This report's centerpiece recommendation—the new PACE service—represents a scale of involvement in the pay industry that is considerably greater than any of the preceding plans, save perhaps the distant prospects of a direct broadcast satellite system.

As long as public television faces the competitive threat of pay television by either ignoring it or by approaching the new distribution networks in a supplicant fashion, no fundamental change or benefit to the entire system will result. Certainly a handful of new productions may result if stations choose to co-produce with HBO or Showtime. Certainly a few stations may benefit for a period of time from cooperation with commercial STV operators. Other advantages would derive from the alteration of program exhibition and sequence policies.

But only the creation of a parallel, nonprofit pay outlet will give public television the maximum degree of control over the changing programming marketplace. This control would come, not by operational or governing intervention, but because of the natural commonality of programming philosophies, and the benefits of joint bargaining and economies of scale involved in acquiring or producing programs for multiple outlets.

Without a participating institution like PACE directly involved in the evolution of the pay television marketplace, public television's opportunity to shape the character of the new media will be severely limited.

CHAPTER SIX

The Home Video Market

Overview

Home video, that is, electronic equipment that enables the consumer to record and/or play back sound and images on a standard TV set, is an important development for viewers and broadcasters alike. These devices give the consumer direct control over when and what will be played on the home television set, rather than relying upon a central programming authority to set the schedule. Both the videocassette and the newer videodisc technologies permit the playback of pre-recorded programming. In addition, the videocassette recorder (VCR) permits the viewer to rearrange programs that are transmitted via broadcast and cable, and thus to watch the program whenever it is convenient.

Home video will ultimately mean viability for programs that satisfy more highly specialized interests and tastes than any other national programming medium. As with today's audio recordings, the home video market allows thousands rather than tens of millions of viewers to be targeted with programming.

Videodisc technology, in particular, will also permit a number of completely new interactive uses of the home TV set, as well as information storage and retrieval, and "programs" that are more information-based then entertainment-based. The stereo sound capability of videodiscs promises to form the basis for an entirely new medium: made-for-disc programs that integrate music with visual elements. The videodisc medium makes practical much wider distribution of video artists' work and will spur new directions of creative activity.

Finally, the home video market, like other new outlets for traditional entertainment products like movies, will add to the ferment that has been building within the program production industry in the past decade. With the more advanced cable and pay cable markets, the home video market will bring about significant changes

in the exhibition patterns of motion picture and television programming because revenues will be derived from new sources. This in turn will affect the quantity and variety of programming available to all outlets in the program marketplace, public television included.

While home video is now attracting broad financial support from the major entertainment corporations of the world, especially movie studios, production houses, TV networks, and record companies, a number of very important problems must be solved before it can grow at the pace that would make it a healthy, new medium in its own right. As with pay TV, the question of copyright and union agreements must be worked out. The early 1980s will be a transition period of extraordinary competition between manufacturers and marketers over technical formats, rights to product, and distribution arrangements. The most important question for the consumer will be the standardization of technical formats. An estimated 20 incompatible videocassette and videodisc technologies will be available in the marketplace during the next few years. An investment of $500–$1500 is considerable, and many consumers will be reluctant to bet that kind of money on a system that may soon be obsolete.

The outcome for home video hinges upon the various systems' technological capabilities, strategies by the major corporations involved in manufacture of the hardware and the programming, as well as the practices of distributors and program producers.

Nevertheless, videocassettes and discs are fairly reliably expected to be purchased by some 10 percent of U.S. TV households by the middle of the decade. Most observers believe that these consumers will not substantially decrease their viewing of more traditional television programming, but the impact will clearly be felt in the program creation and distribution industries that underlie all of these media. It is these questions that the present chapter explores in order to suggest to public broadcasters a number of fruitful explorations in the home video area.

The final two sections of this chapter give the authors' recommendations and observations on public television's current and potential roles in the home video market. Since the corporate and marketing structures are not yet in place, and because consumer demand is still uncertain, the chapter's specific recommendations are somewhat tentative, but revolve around three possible areas of investigation:

- Public television should examine the possibility of expanding its present nonbroadcast distribution activities to reach the

home market. Although a centralized approach is the most sensible, the likelihood of any of the existing distribution arms of the system undertaking this effort is limited. As an interim step, the chapter suggests that an effort be made to clear the rights for individual titles and that those titles be licensed on a short-term, nonexclusive basis to commercial distributors.

- As the market grows, however, the distribution effort should center on the creation of a public television "label." A coordinated effort to clear home video rights to existing and future product and to discover and develop the market will be necessary for the success of this venture.
- Finally, using the existing station membership as a base, public television may wish to create at PBS a home video club to market public television programs to the home viewer.

Historical Development

At the beginning of the 1970s, two somewhat dissimilar groups in our society came together with a new vision of the art and commerce of television. One group, mostly artists, media theorists and academics, dreamed of a flowering of "personal television" that, by emphasizing the TV consumer and producer, could end the stranglehold of the networks.

The other group, mostly manufacturers and executives in the media industries, saw a huge consumer market for new electronic goods and programming "software" that could dwarf both network TV and the booming record business.

Both groups were excited by exotic new technologies that could be attached to the TV set—discs, cassettes, super-8 cartridges. Both groups were slightly premature in their expectations and mostly wrong about the development of this next step in our media evolution. For instance, consider this excerpt from an article in the *New York Times*, headlined "In the Sixties, it was TV; In Seventies, Video Cassettes:" "Manufacturers of home entertainment products are already predicting that the 1970s will prove to be the decade of the video cassette—a compact device that stores visual material for playback through a television receiver."[1]

None of the technical delivery systems being ballyhooed in such articles were brought into production, for a variety of reasons

[1]*New York Times*, July 5, 1970, pp. D1, ff.

And the technology which did begin to affect consumer viewing habits was not purchased as much for its revolutionary programming potential as to make network TV viewing more convenient.

We are currently in another period when proclamations of a "video revolution" are again with us. The success of the home videocassette recorder since 1975 and the imminent national marketing of consumer videodiscs come at a time when cable and the various forms of pay TV are making unmistakable inroads into conventional broadcasting.

Despite continuing optimism for the "new television" industries today, there exists an undercurrent of caution about videodisc and cassette. While major international firms like RCA, MCA Universal, Xerox, IBM, ABC, Sony, Matshusita, N.V. Philips, CBS, Warner, Twentieth Century-Fox, Time, Inc., and others are now staking out positions in the developing field, there is acute awareness of the uncertainty involved in assessing and meeting the consumer home video market demand. They know that the next few years will see a bewildering proliferation of mutually incompatible technologies and formats. Firms entering the market will compete for and with the software, that is, programs designed for use on the various kinds of equipment. They will also struggle over the distribution and retailing patterns for the new industry. Behind all of this competitive positioning is one central question: how many people will really be willing to buy home video equipment, and how will they use it?

The 1970 *New York Times* article cited above previewed three home video formats: CBS's Electronic Video Recording (EVR) system, RCA's holographic Selectavision, and Sony's video recorder. None reached the consumer. First there was the problem of format proliferation and lack of standardization. In addition to EVR, Selectavision, and Sony, there were Kodak's Super-8 Videoplay, the Electronic Beam Recorder, and systems under development by Toshiba, Matsushita, Philips, Telefunken, British Decca, Ampex, Avco, Arvin, and others. Factors such as high cost, lack of service facilities, questionable technical quality, and an unknown marketplace led each of the manufacturers to withdraw.

The Hardware: VCR's

The Japanese pioneered the developments in miniaturization, magnetic tape, assembly mechanisms, and electronics necessary to

bring the VCR into the consumer market and to realize the primary use to which consumers would put the equipment.

The basic videotape technology dates back to 1951, when the Electronics Division of Bing Crosby Enterprises demonstrated the features that constitute the "magic" of electromagnetic television recording, or videotape.

Unlike film, videotape is an all-electronic medium. The tape itself holds a magnetic charge along a field of ionized metal-backed plastic. The images recorded can be played back immediately, and because the electronic impulses essentially duplicate the live transmission, tape creates a sense of immediacy.

In 1956 the Ampex Corporation presented the standard that would be used in the broadcast industry for nearly 20 years—the 2-inch "quadruplex" videotape. Because in this system the information is recorded and played back by means of four separate "heads," it is called "quad." The typical "quad" machines, still in widespread use among broadcasters, were bulky and expensive—they sold for about $125,000 in 1965.

In the 1960s a new video design was introduced called "helical scan," which broadened the market beyond broadcast television. Because the tape runs at a slant against moving recording heads, the same amount of information can be compressed onto tape that is considerably narrower than the 2-inch standard. The narrower the tape, the lower the cost. Since the introduction of helical scan systems, tape width has been reduced to ½-inch—the size of today's home VCRs—and even narrower in some machines.

The 1969 introduction of a portable ¾-inch video system with camera—the Portapak—gave rise to new demand for video products among groups outside professional broadcasting. Sony, as well as its competitors, initially targeted this equipment for the so-called audiovisual market, mostly schools, libraries, industry, and other institutions. And, a new generation of video enthusiasts saw potential in this new portable production equipment that went far beyond the traditional institutional uses, i.e., training and program storage. Sparked by the growth of cable television program origination and public access channels in the early 1970s, a video "movement" began to create new forms of programming which began to influence the television industry at large. Many pioneers turned their energies to public television, which was willing to support some experimentation. For the first time, thanks to other technical advances, programs made with the cheaper Portapak equipment could be disseminated over broadcast and cable television.

In 1972 Sony introduced the ¾-inch cassette format, known as the U-Matic, which, while initially conceived as a home product, was accepted by other manufacturers as a new standard for both the burgeoning educational/industrial market and the professional broadcaster. Unlike earlier helical scan formats, the U-Matic housed tape in a self-loading plastic cassette. Handling became much easier than previous reel-to-reel formats. And the technology improved upon the signal quality and picture stability of the narrower ½-inch tape.

The ¾-inch U-Matic cassette system became completely standardized and interchangeable. Thus, in two short years U-Matic technology spread among professionals of all sorts to create a large institutional video market. Many of these cassette machines were purchased by the 5,000 colleges, schools, libraries, and other nonprofit institutions that traditionally comprised the 16mm nontheatrical film market.

Commercial broadcasters began testing U-Matic production systems, which soon came up to broadcast's tougher technical standards. By the late 1970s, television newscasters were routinely using the portable broadcast U-Matic systems with increasingly sophisticated color cameras and microwave links between mobile trucks and the station.[2]

The Japanese manufacturers quickly moved to adapt the cassette recorder to the home market. In 1975 Sony introduced the first ½-inch cassette system—the Betamax. In addition to selling in video specialty stores, Betamax was offered in mass retail outlets such as record, department, and appliance stores. Unable to develop their own technology, or unwilling to risk the capital expenditure, most American manufacturers licensed one of the two incompatible Japanese standards of ½-inch cassette recorder/playback machines that were available by 1977—Sony's "Beta" system and Matsushita's VHS system. Table 6-A indicates the alignment of formats with manufacturers.

The American consumer bought these machines primarily for their capacity to record programs for viewing at other times. The manufacturers' advertising emphasized this "time-shift" approach.[3]

[2]This era of "electronic news-gathering" or ENG, has virtually replaced newsfilm in the modern TV station. A survey of 483 stations indicated that by late 1979, 42 percent used ENG exclusively; 44 percent used ENG with film. The remainder do no news. Survey by the Radio and Television News Directors Association, cited in *TV Digest*, January 4, 1980.

[3]Universal/MCA and Disney Studios sued Sony and others because they claimed that Betamax copying by consumers of copyrighted materials violated their rights under

Table 6-A VCR Manufacturers and Brands

Manufacturer	*Brand*
"BETA" VCR FORMAT	
Sony	Aiwa
	Sony Betamax
	Zenith
Sanyo	Sanyo Betacord
	Sears Betavision
Toshiba	Toshiba
"VHS" VCR FORMAT	
Matsushita	RCA Selectavision
	Curtis Mathes
	GE
	Magnavox
	Panasonic
	Philco
	Quasar
	Sylvania
Akai	Akai
Hitachi	Hitachi
	GE
	RCA Selectavision
JVC	JVC
Mitsubishi	MGA Mitsubishi
Sharp	Sharp

Sources: *TV Digest* and Nikon Keizai Shimbum.

For the past three years, since the VHS standard was introduced to the American market, there have only been two home VCR standards—the Beta and VHS systems. However, intense competition among manufacturers has led to a battle of optional features—mainly between Sony, the leading Beta marketer, and RCA, the top-seller of VHS format machines. While there are differences in the technical operations of Beta and VHS formats, competition

copyright law. The Federal District Court in Los Angeles ruled in favor of Sony, claiming that private consumer recording of TV signals for noncommercial use was not a violation, but was a "fair use" of the material. *Universal City Studios, Inc. v. Sony Corporation of America*, 480 F. Supp. 429 (S.D. Cal. 1979). The court reserved judgment as to whether VCR recording of pay TV programs or in-school recording constituted a violation. An appeal has been filed by MCA/Disney.

has hinged upon the two systems' different capabilities for tape speed—and therefore the length of recording time possible on a single cassette. When VHS was initially introduced, it was capable of much longer cassette use, and thus captured a larger share of the market from Beta. VHS systems now offer a 6-hour cassette to Beta's 5. Both systems offer options that include automatic timers, fast-forward and reverse scanning, slow motion, pause (to eliminate commercials), and programmable controls. Today about 40 percent of the market goes to Beta format machines and about 60 percent to VHS.

In addition to the existing Beta and VHS systems, consumers will soon be introduced to a wide array of competing formats of video record/playback machines, perhaps as many as 4 in 1980 alone (the 2 new longitudinal video recorders by BASF and Toshiba—which resemble 8-track audio tape systems—the Philips Video 2000 system, with an 8-hour cassette, and a portable unit by Technicolor/Funai). Industry analysts predict that perhaps 20 incompatible technologies in the home VCR field may be unleashed during the next 3 years.

The Hardware: Videodisc

The driving force behind much intense interest in home video is another development that promises to create a mass market as large as the record industry. The videodisc technology, while unable at present to record material from the television,[4] is cheaper and, most importantly, plays programs on discs that are almost as inexpensive to manufacture as ordinary phonograph records.

A consumer's initial investment is expected to be less than $500 for some videodisc models, and a single disc will be priced from $10 to $30. Cassette machines, on the other hand, sell in the $695 to $1500 range, with pre-recorded cassettes in the $40 to $60 range, and up. Duplication is cheaper and faster for the videodisc, and raw materials are much cheaper. Furthermore, videodiscs can carry stereo sound that is compatible with the existing home audio systems. Stereo is not available for VCR systems, thus limiting the market for music-oriented product.

Videodisc technology falls into two main categories—optical and capacitance. Each format has a number of backers, so that

[4]Research is being conducted on erasable videodiscs, but are not expected on the commercial market for five to seven years, according to industry analyst Harold Vogel of Merrill, Lynch.

standardization is not expected. The two processes are significantly different in their operational characteristics and performance. The optical system focuses a beam of laser light on digitally encoded discs and never makes physical contact with the surface of the disc. The capacitance system uses a stylus in a groove, similar to audio LP records.

Although both videodisc formats lack a recording capability and have a shorter playing time than VCR systems, there are several advantages: cheaper software and hardware, better picture quality, and superior audio capabilities. In addition, the optical videodisc systems, which are more expensive and more technically complex, have the capability for slow motion, stop action, and random access. These features permit the recording and instant recall of pages of printing and pictures on each of the disc's 54,000 frames, as well as moving pictures.

The principal optical system has been developed by N. V. Philips of the Netherlands, which has joined with MCA in the U.S. for the marketing of the Discovision system. MCA is the parent company of Universal Studios and MCA/Decca Records. The MCA/Philips system is manufactured in the U.S. consumer market by Magnavox, a U.S. subsidiary of Philips. Pioneer, the Japanese firm, will begin selling a compatible format in the U.S., in cooperation with MCA/Philips. The MCA/Philips system has been marketed in three cities since late 1978, with another five cities to be added this year as a step toward full national marketing in 1981.

MCA has also developed industrial and commercial versions of the Discovision system, notably a sale of 11,000 machines to General Motors for its dealers to use to display the full line of models, colors, and options. MCA has entered a joint venture with IBM called Discovision Associates that is expected to have enormous impact on the nonconsumer market uses of the system. Discovision is particularly well-suited for commercial uses, because it has immediate search capability that permits easy access for demonstration purposes. Because of the optical disc's random access features, the Discovision system is expected to have major impact on the information storage and retrieval, education, computer, library, and other data-based fields. Other firms involved in developing optical disc technology are Sony, Toshiba, Sanyo, and Sharp.

The leading capacitance disc system has been developed by RCA and will be nationally marketed in 1981. The company has been actively seeking agreements with manufacturing and marketing firms to assure that its acknowledged leadership in the consumer

electronics field will establish its Selectavision disc system as the standard for home use. The battle between the Discovision and Selectavision formats is reminiscent of earlier industrial competition over audio recordings and color TV formats. CBS, RCA's traditional rival in these competitions, announced in early 1980 that it would manufacture and market the RCA Selectavision videodisc format. RCA was also able to secure an agreement with Zenith Radio, second to RCA in U.S. TV sales, to join in manufacturing and retailing RCA Selectavision hardware. These major alliances will go far in establishing Selectavision as the major consumer videodisc format.

Other manufacturers have noncompatible disc formats in development. Matsushita, which markets under the Panasonic label in the U.S., scrapped its own disc system in order to adopt a grooveless capacitance system developed by its own subsidiary, JVC. Sony, which has exchanged patents with both RCA and Philips and MCA, has indicated interest in entering the commercial-industrial market with its optical system but is undecided about the consumer disc market.

However, the main competition is expected to come between Selectavision and Discovision. The initial competitive factor is the price of the hardware. RCA's system will be substantially cheaper than MCA/Philips's, or any VCR system currently available on the market—less than $500. Price competition will probably not be so large a factor with the discs themselves. According to one study,[5] RCA discs will wholesale for about $12.50, and retail for a list price of $20 to $25. (Prices will vary according to the nature of the program.) If current record industry trends are any guide, retailers will discount prices from list as a routine matter. Eventually marketers of both disc formats hope to release at prices slightly higher than LP albums, probably about $10. MCA Discovision has priced its current catalog of discs from $9.95 to $24.95 for motion pictures, with no discounting. Discovision is only being marketed in selected cities, and discs are available only in retail outlets that sell the machines. MCA has also not perfected its mass manufacture of discs, so supply lags behind demand.

The other main competitive factor is the program catalog available to buyers of each format of disc hardware. Both companies have licensed a range of product, more than half of which is

[5]Theodore Anderson, "The Emerging Videodisc Market," Argus Research Corp., New York, New York, January 24, 1980, p. 3.

motion pictures. Other categories include network TV programs, "how-to" programs, musical concerts. Each firm seeks exclusive rights to market movies and other product, although the major Hollywood studios have tended to license titles in both formats. Since no mass market yet exists for the videodisc, nobody is quite certain about what will ultimately satisfy consumer taste. Everyone agrees, however, that the videodisc's stereo capability[6] makes relationships with the music and record industries extremely important in the growth potential of the medium.

Estimating the Size of the Market

The size and nature of the demand for home video electronic eqiupment and software is more difficult to estimate than for any of the other consumer media markets we have discussed. The technology is newer, the market more competitive, and there are no prospects in sight for the standardization of either VCR or disc technology. Consumers being asked to make an initial investment of from $500 to $1500 per machine, plus additional software costs, are unlikely to make a hasty judgment when confusion continues to be the byword in the marketplace.

Table 6-B represents the estimate provided by the Japanese electronics industry for videocassette recorders. Issued in June 1979, the predictions for 1979 VCR sales turned out to be overly optimistic.

Most other observers don't have firm estimates beyond a year or two. *Television Digest*,[7] in its year-end prediction for 1980, forecasts 550,000 VCRs, 15 percent above estimated 1979 sales of 480,000 (note 1979 over-estimate in Table 6-B). *TV Digest* predicts 2.6 to 2.8 million pre-recorded VCR tapes will be sold in 1980, representing a retail market of $200 million in sales, and another $25 to $35 million in rentals. (600,000 to 800,000 cassettes will be X-rated.)

Drexel Burnham Lambert, a Wall Street brokerage house, noted that "VTRs (videotape recorders) will continue to be purchased by some as a luxury home electronic entertainment product, principally for recording television programs being transmitted when the home owner is unable to watch. We also believe that VTR

[6]The Philips/MCA format on the market offers stereo. Initial RCA machines will not, although the company has said it will add the feature later.
[7]*TV Digest*, January 7, 1980.

Table 6-B Actual and Projected Sales of VCRs and Blank and Prerecorded Tape (In Thousands)

	VCRs	BLANK TAPE	PRERECORDED TAPE
1976	43		
1977	225	3,000	
1978	402	5,300	1,200 (67.5% X-rated)
1979	575	11,120	1,600 (increase of 41% in non-X-rated material)
1980	850	17,120	
1981	1,100	25,270	
1982	1,500	36,000	
1983	2,100	52,000	

Sources: Electronics Industries Assoc. of Japan, cited in *Television Digest*, 12:26, p. 11, June 25, 1979, and *Merchandising*, March, May, and August, 1979, quoted in "Home Video," Report to FCC Network Inquiry Special Staff, by Don Agostino & Assoc.

could make major inroads into the home movie market. . . . Nevertheless, we do not see VTRs having a place in households that want to view only a library of prerecorded product because of the high price of videotape, both blank and prerecorded."[8]

DBL concludes: "While VTRs should enjoy good sales growth in 1979 and probably again in 1980, we expect sales to level off and probably decline thereafter when broad introduction of videodisc systems is expected."[9]

Other industry observers believe that VCRs—as they are more commonly called—will remain a "videophile" or specialized hobbyist product, rather than a mass market item. VCR sales have yet to pass 500,000 per year, which is low by the standards of an industry that annually sells more than 15 million TV sets, almost 40 million radios, and 5 million phonograph and stereo component systems.

Even if VCR sales reach 1 million units per year before the full impact of the disc is felt—now considered doubtful even by those who predicted such numbers last fall—VCR sales are expected to be dwarfed by disc in the 1983–84 period,[10] when full catalogs of movies, recorded music, and new material is expected on videodisc (contingent upon necessary labor agreements).

[8]John S. Reidy, C.F.A., "Evolution of the Media in the 1980s" (New York: Drexel Burnham Lambert) September, 1979, p. 111.

[9]*Ibid.*

[10]Conversations with industry representatives, trade press reporters.

Estimates for videodisc sales, and their impact on VCR sales, are even more difficult to make. Top officials at Magnavox, the Philips-owned U.S. electronics manufacturer, have predicted sales of $4.2 billion by 1985 for the company's model. RCA has projected the entire videodisc hardware and software industry at $7.5 billion annually by 1990.[11] Drexel Burnham Lambert hypothesizes 1 million disc machines sold in 1981, 2 million in 1982, 3 million-plus in 1983, 4 million in 1984, or 10 million total by 1985.[11*] Argus Research predicts 1980 videodisc machine sales at 100,000, rising to 4 million units by 1985. The study says that disc hardware sales will exceed VCRs in 1984, and that 11,640,000 VCRs and 9,310,000 disc players will be in use by the end of 1985. Table 6-C presents the sales summaries from this report.

Estimates of the size of the home video market tend to lump it together with all the alternative distribution technologies. Harold Vogel, of Merrill, Lynch, Pierce, Fenner & Smith, Inc., offered the following projections:

> (B)y 1985 there will be 12 million videocassette households, 14 million videodisc households split about evenly between the MCA-optical and RCA-capacitance systems, at least 30 percent television household penetration of cable (or about 25 million) and 25 STV systems generating over $1 billion annually from about 3 million households. The videodisc market including commercial, industrial and home players and discs could then easily exceed $3 billion annually, with the videocassette market over half the size of the videodisc market. Given another 15 years in aggregate, I believe the new industries will be larger than the broadcasting industry.[12]

Taking a different approach, David Butterfield of Management Analysis Center delivered another set of audience share projections to the 1980 conference of the National Association of Television Program Executives: by 1985, all the new media taken together would total only 10 to 12 percent of all TV viewing. Cable penetration would be at 34 percent, with 54 percent of homes passed. Seventy percent of new homes passed would take pay, with pay penetration reaching 17 percent of the total TV universe. STV will

[11]Cited in "The Dazzling Business of Home Video," *New York Times*, February 17, 1980, p. F-11.

[11*]Drexel, Burnham, supra.

[12]From a speech to the 19th Conference of the Broadcast Financial Management Association, September 17, 1979. In a 1980 interview, Vogel revised downward a number of the 1985 projections estimating 10 million VCR households and 8 to 10 million disc households. The revision underscores the difficulty in making such long-range projections in this field.

Table 6-C Estimated VCR and Disc Sales 1980–1985

	VCR		DISC	
Year	Sales	Penetration	Sales	Penetration
1980	700	2.5%	100	0.1%
1981	950	3.7%	300	0.5%
1982	1,300	5.2%	700	1.4%
1983	2,000	7.5%	1,500	3.2%
1984	2,500	10.4%	2,700	6.4%
1985	3,000	13.7%	4,000	11.0%

Source: "The Emerging Videodisc Market," Theodore Anderson, for Argus Research Corp., New York, New York, January 24, 1980, pp. 3–4.

be offered by 36 stations in 30 markets with an average 9 percent penetration; total U.S. penetration of 4 percent. Discs and cassettes will reach 10 percent penetration by 1985.[12*]

Using the Vogel figures, we can see that by 1985 revenues from all the new technologies—cassettes, discs (both hardware and software), pay TV and STV, may total $5.5 billion, similar to network TV revenues. But that figure isn't so staggering when we realize that today consumers are already spending some $2.5 billion a year for, as Stephen Reed of CBS put it, "various video products and services that increase their programming options and control." And, he continues, "virtually none of the programming is original or unique."[13]

Programming for the Home Video Market

Initial marketing of prerecorded videocassettes in 1978–79 focused primarily on films previously released in theaters—either classics, more recent blockbusters, or pornographic films. While a number of videocassette duplication companies, distributors, and middlemen have entered the market, they have usually done so by licensing product from the major copyright holders, mainly movie companies. The Motion Picture Association of America reported in March 1980 that during the prior 16 months the number of titles made available by the nine member studios (MCA/Universal, Para-

[12*] *Broadcasting*, February 25, 1980, p. 32.

[13] Stephen Reed, "Programming for the Videodisc," at International Tape Association seminar, October 25, 1979.

mount, Columbia, Twentieth Century-Fox, Disney, Warner, United Artists, MGM, and Avco Embassy) totaled 477 titles. During the 1979 all 9 members made titles available to the home video market, and 6 of the companies have established their own divisions or subsidiaries to distribute or market home video product.[14] This represents a major departure for the film industry, which heretofore only rented films for exhibition by theaters, networks, television stations, and others. (Sales are made in the 16mm market, but relatively few, and at higher than "consumer" prices.)

As the interest in home video, especially disc, continues to grow, the software market will see additional entry by other companies with title to existing product. The networks have begun to offer the product that they themselves produce—mainly news, sports, and entertainment. The television production companies—both the so-called independents and the movie studios that produce for television—are expected to license their series for home video distribution. Other programming entities, including the pay cable networks, new divisions of existing media companies, and perhaps a handful of newly capitalized companies, will offer consumers a wider range of product licensed from foreign and domestic sources but not previously available on television or elsewhere.

But the patterns of distribution in this transitional period are still evolving, and many industry observers expect a period of intense competition while disc and cassette markets begin to attract middle income consumers. Notes Harold Vogel of Merrill, Lynch:

> (S)oftware producers have generally been careful . . . to limit the terms of exclusive contracts, so that after an early flurry of perhaps brief and rapid growth, videocassette renters and sellers will, we believe, inevitably confront highly competitive market conditions. Once the number of video tape players in use is large enough, the entertainment companies may find it convenient to enter the business themselves and to distribute programs through the usual record and tape merchandising channels that companies such as MCA, Warner Communications and Columbia Pictures have already established.[15]

The videodisc will be widely launched only with the full participation of the major record/tape distribution corporations. During their expansion, limited amounts of original programming for videodisc and cassette will begin to emerge that would not have

[14]Speech by Jack Valenti, MPAA President, at the International Tape Association seminar, March 3, 1980, quoted in *Variety*, March 5, 1980.

[15]Merrill, Lynch, Pierce, Fenner & Smith Institutional Report, *Video Market Commentary*, March 12, 1979, p. 5.

been likely to appear without the addition of that extra market. Already isolated examples of such product from smaller companies have been seen, such as the staging of a rock opera in San Francisco, to the Ron Hayes Music Image videodisc/cassette of *Tristan und Isolde*.

Original home video programming will probably not be common for a number of years because union agreements for such programs have yet to be signed by producers or distributors and because the size of the audience using machines of any standard will not be large enough to sustain costs. Says Drexel Burnham:

> All product categories have . . . significant development investments and distribution costs, and many products have a limited life cycle since shelf space is finite. A producer of videodisc materials, whether the subjects are entertainment or information, will continually have to weigh the development, investment and distribution outlays against potential revenues and profit streams from the products.[16]

This point is supported by Merrill, Lynch's Harold Vogel:

> . . . (N)ew varieties of programming would evolve for the new video media, and . . . such programming would be economically feasible to produce for audiences several times smaller than the audience for network television. Nevertheless, important financial success could probably be achieved only if a program were produced with relatively high and expensive standards for writing, editing and directing. With a substantial mark-up necessary to induce widespread distribution and advertising, the total production/distribution cost of programming would, in our opinion, remain high enough to preclude production of extremely specialized (i.e., very small audience), low-budget programming.[17]

Analysts disagree on estimates of the number of sales necessary in either videodisc or cassette for a profitable venture. Much depends upon pricing, which in turn depends upon the size of the market, degree of competition within and among formats and production and royalty costs. For comparison, it is useful to examine the breakdown of LP records. The average $8.98 retail album is wholesaled to stores for about $4.00 and sold at prices that vary according to outlet. While the costs and various percentages vary from product to product, the following has been offered as typical for an LP with substantial sales (two million).[18]

[16]Drexel Burnham, *supra*, p. 117.

[17]Merrill, Lynch, *supra*, p. 1.

[18]Jack Egan, "Breaking Records in the Record Business," *New York Magazine*, March 26, 1979, p. 41.

$1.33	- artists royalties (33%)
.125	- studio recording costs (3%)
1.37	- record company profit (34%)
.20	- promotion, publicity (5%)
.70	- manufacturing, pressing, cover costs (18%)
.275	- copyright fees (7%)
$4.00	

Variables within this breakdown might include higher artist fees for superstar performers, increased production costs, and additional promotion. But as volume goes up, more can be spent without affecting the percentages.

Price breakdowns for videocassettes and videodiscs will be different from LP record product, as well as from each other. The factory cost of videodiscs is considerably less than for VCR cassettes—about $1 to $2 versus $5 to $8. (Blank cassettes wholesale at $9 to $11 in bulk.) The Argus Research study[19] offers the following cost breakdown for the RCA videodisc:

$ 2.00	- royalties
.10	- write-offs
.15	- union fees
1.00	- manufacturing costs
.25	- overhead
1.50	- promotion
6.50	- profit
11.50	- factory cost
1.00	- distribution mark-up
$12.50	- wholesale price

Because of the competition over the hardware formats, the relatively small market size, and the unsettled patterns of distribution in the video software business, most of the activity in the field will concentrate upon licensing existing product, staking out a position in the as yet unformed industry, and planning for the time when production for disc is feasible.

It appears that 3 groups will be most successful in this competition. First are the motion picture companies; second, the record companies; and third, new entrants that have not previously been involved in marketing films or records directly to the public.

All 9 of the major studios have begun the process of entering the home video market, either by disc, cassette, or both. Each company is entering the video market at a different pace, with

[19]Anderson, *supra*, p. 3.

different strategies for both their existing product and new production. Among the decisions facing these product owners are: policy on cassettes versus discs, exclusivity versus broad availability, direct marketing to the consumer versus licensing to a distributor, becoming a distributor for others, and sale of video products versus leasing. Their decisions will influence the structure and growth of home video, because they control such large catalogs of product. Their experimentation in distribution can be expected to continue for a number of years. The results will undoubtedly have an impact upon the release pattern of movies in other media. For many years the typical sequence of play for a motion picture was (1) theatrical, (2) foreign theatrical, (3) U.S. network, (4) foreign television, and (5) U.S. domestic and/or worldwide TV syndication. Pay cable and subscription television have already added new "windows" in this chain immediately after theatrical release, and six months to a year before network release. Because VCRs can "steal" this product uninterrupted from pay television, the movie companies are now moving to release them earlier to VCR. Universal, announcing its first cassette deal in 1980, released two pictures that had opened theatrically as late as Christmas, 1979. Neither had had television exposure. By 1981, when discs reach the market, motion picture release to the home video market prior to pay TV exhibition will probably be standard. Several studio executives have even advocated simultaneous theatrical and home video release.

Another turning point will be reached when the home video market is significant enough for the studios and other major program producers to release a product directly for the disc/cassette market before theatrical release. That point may still be somewhat distant for the movie companies, which reap substantial profits from theatrical rentals. However, if the theater owners are successful in eliminating so-called "blind bidding" practices, under which they are forced to guarantee revenues to a studio without having screened its film, the studios will turn more rapidly to the pay networks and home video.

The second major group is record companies. At present there are 5 major distributors, plus a network of independent distributors that control most U.S. records. The leaders, CBS (Columbia), Warner/Elektra/Atlantic (WEA), Polygram, MCA, and Capitol/EMI, each have links through their parent company to an international film or broadcast operation. The record companies can be expected to play a leading role in the creation of the home video market, especially for videodisc programming, because they own record

manufacturing plants, control national distribution systems, and because 3 of the 5 majors have an interest in the hardware systems themselves (RCA, Polygram, and MCA). We shall return to the recording industry for a more detailed exploration of this new disc programming market.

The third group of contenders are newcomers to the direct retailing of audiovisual software to the general public. They include publishers, new cassette distribution firms, television networks, and program producers.

At the forefront of this group is Time, Inc. which operates several units that may have substantial impact on the home video field. Through its HBO and Time-Life Video divisions the company is acquiring home video distribution rights. Time has launched a video club, modeled after its book mail order operations. Time also operates TV and film distribution in syndication, institutional, and network markets, all of which can supply the company's home video operation.

Among the 10 regional tape duplication centers that have sprung up to meet the new home VCR software demand, one firm has also pioneered the wholesale and retail distribution chains that provide today's consumer with prerecorded cassettes. Magnetic Video, now owned by Twentieth Century-Fox, can be expected to branch out into discs and remain a force in the distribution field, while many of the smaller, specialty distributors are more likely to be absorbed as economies of scale and the need for aggressive national sales forces become more important.

Serious contenders also include the television networks, producers and syndicators. RCA, which owns NBC, is involved in manufacturing one of the major disc formats and distributing programming from many sources on that format. CBS, through a video enterprises operation within the Record Division, has announced its plans for distribution of cassette and disc product and recently announced it would produce RCA discs. ABC has established a new Video Entertainment division and has been very active in licensing its own product, and acquiring other product as well as making plans for the production of new product. (For example, a joint venture with film director Robert Altman and The Shubert Organization plans to bring Broadway to the home.)

The major TV producer/syndicator, Viacom International, 50 percent owner of the Showtime pay cable network, may be propelled into home video for one of the same reasons Time, Inc. was: It sees an added market for its commercial and pay television

product. Other syndicators will certainly be lured into home video as the market grows.

The results of entry by these and other new participants in retail and wholesale video product distribution may have an impact on the configuration of the industry. But clearly the record companies, with the combination of a national retail distribution operation and ownership of substantial product, are in a better position to dominate the videodisc marketplace than any other sector of the entertainment business.

In addition, claims Stephen Reed of CBS Records:

> . . . (T)he consumer can *actively* watch and listen to the (video)disc, or use it as he would a conventional record and *passively* listen. This active/passive option, combined with the demand for repeat-use potential, the importance of music in the contemporary lifestyle, and the growing multi-media aspects of the music business, suggest that musical videodiscs will ultimately be the most popular. We expect that in five to ten years, when the industry is established, about 50 percent of videodisc sales will be musical programs.[20]

The turning point for financing original disc programming may come soonest for the record companies. Already experienced in the business of manufacturing and marketing vast quantities of audio products, they are best positioned to realize the economies of scale needed for a reasonable return. Estimates vary from 30,000 to 50,000 pressings as the minimum number of discs necessary to make a profit. During the coming growth period, these figures will be targets only rarely achieved.

What format will have such appeal is subject to great speculation, of course. Because of the proliferation of videocassette recorders that can capture product from pay television and other outlets, the disc labels will, like records today, seek to amass product that is exclusive and substantially unavailable except through direct purchase. During this transition period, in anticipation of the start-up of the disc market, the record companies are experimenting with "hybrid" product, largely through their existing promotion divisions that finance videotapes of artists' performances to send to disc jockeys, and others in the business, as well as on broadcast showcases like "Midnight Special," and on pay cable outlets like HBO's "Video Juke Box."

A major reason for record companies' interest in the disc over the cassette is sound quality. The Philips system offers stereo which

[20]Stephen Reed, "Programming for the Videodisc," at International Tape Association Seminar, October 25, 1979.

is equivalent to or better than conventional phonographs. The RCA system will first be marketed without the stereo feature, although the sound quality is still superior to VCR audio.

In September 1979 the first full-scale video production of an LP record was financed by Chrysalis Records for the rock act Blondie. Numerous artists and labels are interested in such productions, with an eye toward the evolving home market. Specialized production houses have sprung up and can be expected to become the nucleus of a new genre of program styles built around the personalities and talents of musicians. The implications of this development are major, if one remembers that the two top grossing films of 1978 were *Saturday Night Fever* and *Grease*, both oriented towards popular music. In both cases, the revenues generated by the album sales exceeded the motion picture receipts.

The record companies expect to release new LPs in both audio and video versions, priced within reach of the average consumer. The premise is that a music fan may be willing to pay extra for the visual experience on disc, even if he only watches it a few times, because the repeatibility of the stereo sound would be the same as a normal record. And, if the record companies' hopes are fulfilled, new artists will come along that can make the videodisc medium as successful in the 1980s as audio LPs have been since the late 1960s. As Jo Bergman of Warner Records puts it, "We're looking for our *Sgt. Pepper*," a reference to that seminal Beatles recording that established the precedent for multi-million unit record sales.

Rights: The Major Stumbling Block

With major record labels holding exclusive contracts with hundreds of recording artists, one might wonder why more original video product is not already available. The principal reason is uncertainty over the terms of payments for rights to exploit the new market. The principal parties are the unions for actors, directors, writers, musicians, technicians and stage hands, music publishers, talent agents, record labels, and the copyright holders for the film, music, script, play, or other underlying rights.

No contracts exist yet for the home market, nor have standards been negotiated that are acceptable to the various parties. Prior to the disc/cassette agreements, unions and others must negotiate terms for the pay cable market, which have been underway for many months. At the heart of this dispute is the desire of some talent unions to participate in a percentage of the gross revenue, rather

than the arrangements generally prevailing in television which are characterized by up-front payments.

Because there are so many parties involved in the record contract, any one of them can successfully block the video release of a disc. Thus, executives at the disc firms told us of numerous cases where a filmed concert or other videodisc material was ready for consideration, only to be vetoed by one or another party.

One technique widely used in this phase of the business is simply to release a product on cassette without clearing rights, and letting settlements come through litigation. The history of the transition periods in other media is littered with similar copyright suits.

Public Television and Home Video: Current Posture

While no unit within public television is presently involved in distributing existing programs or producing new programming for the retail market, some basis exists today for a transition to that market.

The first step would be to extend existing nonbroadcast distribution of programs—mostly now to institutions and schools—to the consumer marketplace. The second would be to step up present experimentation in the new capabilities of the videodisc, primarily for educational purposes.

Public broadcasting has long considered distribution of its programs in nonbroadcast formats like 16mm film and U-Matic video cassette as a suitable extension of the audience it attracts on broadcast. While relatively small amounts of revenue are generated by servicing schools, libraries, colleges, and other institutions in the nonbroadcast audiovisual market, public broadcasters have considered such distribution as a part of the overall service mission of the enterprise.

There are three primary routes for reaching the 5,000-odd customers in this market: the PBS-operated distribution operation (VPS), station-operated distribution departments, and contracts with commercial distributors.

PBS's video distribution system has fulfilled two functions since it began as the Public Television Library in 1971.[21] One is the distribution of broadcast quality programs to PBS member stations for delayed transmission after the initial PBS distribution. The second

[21]The bicycling of tapes to stations for delayed broadcast had been a major function of the National Association of Educational Broadcasters, prior to the creation of PBS, which was the first fulltime interconnection of public TV stations.

is video cassette distribution to the audiovisual market, a function which began in 1975. During the last year, as part of PBS's reorganization, the station-servicing function has been merged into the PBS program department, and the cassette distribution function renamed the Video Program Service (VPS).

Today the VPS houses some 2800 programs, represents about 80 PBS member station producers.[22] During its first four years the PBS operated service has functioned largely as a passive order fulfillment agency. It has a large number of titles in its catalog, and, therefore, rarely provides special promotion, targeted sales efforts, or other individual treatment for any particular title.

In 1978 the group had begun making its products available upon request in the VHS and Beta VCR cassette formats, since an estimated 50,000 of the first half-million VCRs had been purchased by institutions that were the principal patrons of the Video Program Service. In 1979, 5 titles were selected from the VPS catalog and a special promotional mailing sent to institutions that offered Beta and VHS formats at prices competitive with other programming offered in those formats—about $60 per tape, instead of the normal price of over $200 for distribution to the audiovisual institutional markets. VPS continues to offer the two home video formats upon request, but discontinued its active promotion of titles, pending the resolution of several rights issues involved in entering the home video market.

VPS is now re-examining its own policies, both in terms of the rights questions involved in possible home video entry and in terms of its operating policies. Several of the largest PBS member stations (WNET, for instance) choose to avoid VPS altogether, opting either to distribute programs themselves or to consign them to commercial distributors. While these stations consider VPS effective in operating the tape duplication and order fulfillment functions that are the primary tasks it performs, the critical roles of sales and promotion have been lacking at VPS in the past. VPS staff members are in the midst of recommending changes in this policy, to enable them to concentrate upon programs with higher demand. Once the rights questions have been resolved, VPS could well be positioned to distribute more actively than it has in the past.

[22]Its 1978 revenues were $231,883. Total revenues for the videocassette sales and rental services since 1975 were $771,586. Royalties to stations during that four year period were $216,422, or 28 percent. No single producer earns much from royalties—WGBH-TV led in royalties for the last six-month period in 1978 with $4,029. Only 9 producers earned more than $1,000 in this period.

Like PBS, which has no home video rights for its catalog of programs, the active producing stations like WNET and WGBH, among others, are currently taking stock of their inventory to determine the necessary steps to clear rights for home video distribution. While the institutional VCR market is a minor concern, greater potential is seen in the home consumer video market. WGBH has already licensed 2 of its popular "how-to" cooking shows ("Julia Child" and "Romagnoli's Table") to videodisc companies on non-exclusive contracts. WNET reports that of the hundreds of programs it has produced and owns, some 350 seem suitable for general audience distribution on disc or cassette.

Thus, the objective of offering programming in the home video market as a way of extending the reach and improving service to viewers promises to be a slow process of rights clearing, involving judgment about whether enough customers might exist for a program to justify advance payments to talent, writers, directors, copyright holders, and the like.

The other activity currently being pursued by public broadcasters in the home video area is new program development. Many of the major producers have held discussions with RCA and MCA about the provision of financing in advance for original, made for disc product. There are several obstacles. First, most distributors are first filling their catalogs with existing product. A relatively small amount of new programming is currently being financed—although there have been reports that RCA spent $65,000 toward a budget of $190,000 for a "how-to" program that helped round out its Selectavision disc catalog. Second, the category most likely to receive early financial backing from disc companies appears to be popular music. Although public broadcasting has produced some excellent popular music shows (such as "Sound Stage" and "Austin City Limits," specials like "Big Band Bash," and concerts from Wolf Trap and elsewhere), negotiating for home video rights for existing and new music programs is likely to be costly and time-consuming.

The most extensive direct public television involvement in video program development has been in a completely different context—the educational use of videodiscs. Because the Philips/MCA Discovision technology can be used in conjunction with computers, its capabilities for high-speed information storage and retrieval make it an extraordinary teaching tool. With the proper hardware attachments, the user can "command" the disc to move to any point in the course of its 54,000 frames. Each frame is coded so that programs can be constructed to enable sophisticated viewer

interaction. A question can be asked of a viewer and his response can trigger one of several different answers that are located at different "addresses" on coded disc.

A variety of such instructional programs have been designed and produced in Nebraska in a unique unit launched by that state's ETV Network. The Nebraska Videodisc Design/Production Group, with funds from the Corporation for Public Broadcasting, is a project of public station KUON and the University of Nebraska/Lincoln. The Nebraska group has developed interactive videodisc programs at various levels of sophistication, using different combinations of disc and computer technology, and aimed at different age groups. Programs have been developed on the subjects of metrics, elementary gymnastics, Spanish pronunciation, and post-secondary psychology. Other videodisc experiments have involved teaching the hearing impaired, film study, and adult learning.

The Nebraska experiment hopes to make the transition into a nonsubsidized agency for design and production for videodisc in the educational market. While early stages call for the disc programming to be aimed at the institutional market, the programs could be marketed to the home consumer when the player population is large enough.

Future Possibilities

As with pay television, home video is likely to offer public broadcasters a number of opportunities for extending audience reach and increasing revenues, although we do not expect the potential to come as soon or to be as large as in the pay television market. We believe, however, that three broad areas of investigation merit attention:

1. The expansion of existing nonbroadcast distribution activities to the home market;
2. The creation of one or more public television home video "labels";
3. The initiation of a public television home video club to market programs directly to the home consumer.

1. *Expanding from the Present Base* As we have indicated, public television currently distributes some of its programming on U-matic cassette and film via 3 separate channels. Extending these channels to the home market—either VCR or disc—will involve a

number of important changes for public television. Regardless of the distribution outlet, rights to the VCR and disc markets must be obtained. For programs acquired for public television distribution, home video rights are not routinely licensed because no mechanism yet exists for distribution in that market that would justify additional payments. For newly produced public television programming, home video rights are not included in existing collective bargaining agreements with unions.

The question of rights for new product, as well as the feasibility of launching a public television distribution system for the consumer market, are in a chicken-and-egg relationship. Producing stations and PBS are currently involved in a major investigation of the rights questions for the home video market. One of their concerns in seeking such rights is that unions may see this as ostensible commercial activity that may imperil the favorable terms of existing agreements with various unions in the broadcast area.

However, at some point during the next 1 or 2 contract periods, public television producers must seek to negotiate these points.

Once rights are cleared for a particular program, the producer faces another question: Which, if any, of the existing structures would offer the best method for reaching the home video consumer? Let us examine each in turn.

PBS's Video Program Service now distributes to some 5,000 institutions, which are easily reached by mail, and are regular customers for audiovisual material. It is quite a different prospect to target a market of at least 1 million home consumers, a number which is growing every year. In order for VPS to expand its video distribution from institutions to mass consumers, it would need to establish or subcontract a field force to sell and service thousands of retail and wholesale outlets that carry video products. Even so, a centralized approach would seem to make more sense than for every producer to establish its own in-house video marketing arm. Economies of scale are considerable in areas like tape duplication, catalog printing and mailing, order fulfillment and the like. A venture such as this would be much larger than the relatively simple institutional distribution structures located at certain stations, and at VPS itself.

Gathering the major producing stations into a single umbrella home video marketing arm would be difficult, primarily because each organization jealously guards its own prerogatives. Even if this were accomplished, we have serious questions about whether a

wholly-owned consumer marketing arm is justified at this time. In this period of fluid and highly competitive transition to a full scale home video marketplace, public television would be a relatively small force in the field.

Even the major film companies, with considerably larger backlog of popular product, have until fairly recently licensed distribution rights to middlemen rather than market directly. The entry of several studios into direct distribution this year will reveal a great deal about consumer behavior, and will offer many lessons to the smaller producers in public television and elsewhere. In many ways, public broadcasters may well regard home video as a service function, like current institutional sales, rather than as a source of significant new revenue. Videodiscs, the largest mass market, won't be significant until 1983, at least. Even with a universe of 10 million, and a likely profit of $6.00 per disc, relatively few discs will be profitable for some time to come. It seems unlikely that public television's programs will offer that kind of mass appeal. As to VCR sales, at $40–$60 per cassette, the market is even more limited. Player population will probably be smaller, and VCRs don't feature stereo.

The wisest short range strategy for public broadcasters, then, should be to clear rights for specific titles, and to license them to commercial distributors, either individually or in packages. Some producers may choose to farm out these tasks to another station, or to VPS, because it is primarily a negotiating process requiring legal and business skills. If possible, producers should do so on a nonexclusive basis, to determine which organizations and which marketing methods are most effective. In addition, the term of license should be limited in duration so that after a test period the decision can be revisited.

As those producers already engaged in the task can testify, clearing rights is not necessarily an easy task. Programs which may seem to offer the greatest potential for consumer sale, and which could reveal the most about potential consumer response, are often those requiring the most difficult negotiations. As with pay television issues, producers must weigh the question of opening talks with the various unions against possible repercussions in other negotiating rounds. However, some progress has been made on an experimental basis by producers seeking the right from unions to test consumer response before negotiating completely new contract terms. Similarly, copyright holders may permit producers to test the market, since revenues will be slight. At a minimum, producers clearing rights

to existing product should only license them for home video when the likely revenue is estimated to cover costs of buying up the rights.

Finally, we should emphasize that these moves by producers should continue to be coordinated and studied by others in the system, especially PBS. We believe that during what appears to be a period of home video growth and format confusion, PBS and its producers should develop a coherent, step-by-step plan for testing, evaluating and moving slowly into the market. This is consistent with a next phase we believe is worth studying.

2. *The Public Television "Label"* Despite the continuing interstation competition in areas such as secondary distribution, it will be in the interest of all producers to monitor and evaluate the results of such individual program placements on a systemwide basis. As the number of VCRs continues to grow, as the disc becomes a medium in its own right, and as consumer behavior begins to take shape, it will be crucial for the system to have adequate data upon which to base its next step.

It may well be that the peculiarly decentralized production structure of PBS would make a centralized approach to home video distribution impossible. But it is not logical to force the consumer to deal with more than one overall PBS source. As equipment formats proliferate, and as program distributors compete for attention with their "exclusive" catalog offerings, consumer confusion is bound to rise. If consumer access to public television's program output is splintered among stations across the entire industry, a natural sales advantage would be lost. Public broadcasting's image of high quality production, its diversity of program styles, and its standards of taste and judgment are unmatched by other producers. In the expanded home vido marketplace, such advantages should not be squandered.

The best way for this identity to be maintained is the establishment of at least one "label" that carries the public television stamp. The notion of a "label," of course, is borrowed from phonograph records. The major home video production and distribution companies will each have a number of their own fully owned, as well as associated or affiliated, labels. They could perform the manufacturing and distributing functions for a public television label. What remains are the production, talent, legal and packaging aspects, all of which are within public television's areas of greatest expertise.

There would be two prerequisites for a public television label. First, a sufficient volume would be necessary to justify specialized marketing. Second, the distributor would probably demand exclusivity.

In order for a volume of product to exist, a concerted effort will have to be made by public television to clear rights to already produced product, to include home video rights in contracts for new product, and, perhaps, to acquire home video rights for some product which may not appear on public television at all. Furthermore, a full-scale label would need considerably more cooperation on the part of the major producers within PBS.[23]

The advantages to such cooperation would be many: greater sales and thus more revenue; retention of a public television identity, even through distributed among more commercial offerings; the opportunity for joint promotion by PBS and stations of the availability of programs in home video formats.

If a home video label comes into being, it will more than likely be an evolutionary development, following the short range process of rights clearances, individual producers licensing specific titles to an array of different distribution arms, and a common evaluation by the system of the potential size of the market and advisability of pooling resources.[24] If each of the major stations experimented in some coordinated fashion with VCR and/or disc distribution of targeted programming during a limited period, they and the rest of the system would be in much better shape to evaluate the potential of a consolidated and exclusive label in each of the home video formats. Such a coordinated test period is also advisable, given the relative paucity of product currently optioned for home video distribution within PBS, as well as the considerable uncertainty of the competing videodisc and cassette formats. Any exclusivity at this point would be unwise. However, in future years we expect that contracting with a marketing firm, especially for the disc, will be necessary for full market impact.

To pursue this option, public television's producers must take the necessary steps to negotiate terms and rates with unions that

[23]Individual producers always prefer their own identity, and claim there is more viewer loyalty to entities like WNET/Thirteen than in the broader "public broadcasting" designation. This is probably true in individual market areas, but is a negligible consideration in national and international marketing that will characterize videodisc and cassette distribution.

[24]The development could be compared to the development of the recent public television magazine, *The Dial*, which will premiere in four TV markets this fall. *The Dial* will be a *TV Guide*-type publication providing common editorial material but regionalizing listings for the four participating public television stations. *The Dial* will replace the separate station magazines, will carry advertising, and will probably be extended to other markets once it is tested.

would permit home video distribution. Stations and other producers should complete their assessments of existing product to determine what could be attractive for home video. Unlike the pay television market, which needs new and original programming, the home video market will initially be built upon catalogs that have advance audience. Many of public television's greatest successes are programs that have great shelf life and that consumers may wish to own. This is particularly true with musical performances, children's programs, "how to" programs, some documentary and informational shows.

Typically, companies now entering the home video marketplace are aggressively seeking rights to product in the international marketplace, traditionally a source for considerable public broadcasting product. The system should give serious consideration to contracting with an agent to act on behalf of public television in this marketplace. Commercial entities are now purchasing *all* rights to some valuable properties, even though they may be primarily interested in home video rights, a practice that could deplete the supply of product in which public television has traditionally been interested. If public television is considering acquisition of a program for broadcast—say for "Great Performances"—the additional fee required to clear home video rights *may* be worth paying now, especially if the system develops its own distribution system.

If public broadcasting enters the home video market slowly, with existing or acquired product, it will establish a reputation in the new medium. The next step is to originate made for disc/cassette product. Thus, the structuring of the business relationship we are calling a label implies more than a repackaging function. Ultimately, it will mean the support of another center of creative activity, another entry point for new programming to find its way to viewers. Public television producers could well produce some of this specialized programming fare.

Further, we expect a wide range of program exhibition sequences. If public television can and wishes to carve out a corner of the home video marketplace for quality programming, the dividend could be more than earned revenues. By definition, the label can be a more specialized medium than any form of broadcasting. If estimates are correct, a pressing of perhaps 30,000 videodiscs can become a viable venture. Even by public television's relatively small broadcast audience standards, that is highly specialized. There will likely be a new group of video recording artists, whose audience will find them primarily on nonbroadcast media; as with radio

today, broadcast and pay television will become vehicles for informing potential customers about new artists and new formats.

Just as public television pioneered early forms of video experimentation—synthesizer-created imagery, small format documentaries, personal narrative journalism—so, too, could the system foster new explorations of home video, something which promises to be the most personal of media. Individual video and music artists, dancers, other collaborative artistic enterprises *do* have an audience, albeit small and selective. The challenge for the home video label is to sustain that creative work and find its audience.

3. *The Home Video Club* As with books and records, home video is being merchandised both in retail outlets and through mail order clubs. While public broadcasters have little expertise in the mechanics of retail sales and distribution, they have enormous resources in the merchandising of products through the mail and over the air. The PBS fundraising and auctions, a source of annoyance to some viewers, but a necessary evil in a system needing contributions, has yielded an extraordinary business relationship between local public stations and their viewer/contributors. Nearly 3 million individuals are members of local public broadcasting organizations, and they voluntarily show their appreciation for the service by mailing in checks. Some are lured by "premium" gifts offered during pledge weeks. Often, these premiums are books, records, or other items related in some way to the programming. Indeed, the best-seller lists frequently reflect the impact of a PBS broadcast of a book adaptation.

We believe that the membership of public broadcasting stations is a natural marketplace for home video, cassettes, and discs and that an organization to market and distribute programs should be established by the system. Unlike distribution through retail outlets, no complex chain of distributors, franchisees, salesmen, and publicity agents is necessary. Indeed, there exists a presence for public broadcasting in every region already—the stations. As the various new technologies offer stations new opportunities, many have chosen to recast their role as a telecommunications center for the entire region. Capitalizing upon the relationships with local institutions, with viewers of the station, and with retailers, these telecommunications centers could become a critical part of a new nationwide Public Television Video Club.

Central operations for such a video club would resemble other mail order operations: It would obtain rights to product, establish a

contract with a tape duplicating company, rent a toll-free "800" number, and market the product. The "800" number would connect callers to a fulfillment center, which would transfer the order to the duplicator, who would ship the product.

The club could start rather modestly, with a limited number of titles. Ads could be placed in the magazines of every station desiring to participate. Some revenue split would be negotiated among the stations (which would actually be intermediaries), the producer, and the Video Club. As more titles are cleared and revenues grow, the club could expand its advertising into general or special interest magazines beyond the PBS station membership.

There is great incentive for the creation of one central video club for the entire system, especially if it were merchandising products on a nonexclusive basis. The local stations surely would not clutter their magazines with half a dozen ads for different producers, unless they were selling the space to them as any other customer. Further, economies of scale would not sustain duplicate operations. The identity factor discussed in the label would also apply here.

What is the appropriate agency for operation of a video club? Our recommendation in this case would be PBS, and its Video Program Service. The alternative would be to create a new organization or to place the function within one major producing station. Neither seems wise, particularly since this activity would require two skills that seem to have been performed well in the past by VPS: Effective relations with the various stations within PBS and tape duplication and fulfillment activities.

The third priority for the club would be marketing. It is here that VPS would have to focus its attention. A video club would exist only if it could meet the interests and needs of consumers, not the self-interest of all PBS members and would-be producers. The club would be required to conduct market research as the experiment progressed, and to tailor club selections, promotions, pricing, and advertising according to consumer appeal. It would also be required to compete in the marketplace, against other home video clubs, against retail sales, and off-air taping. Such marketing skill is not beyond PBS, but it would mark a change in attitude.

In conclusion, we see the home video market as several years behind pay television in development and fraught with many more risks for an unknown response. Entry into this field would involve public television in retail marketing and wholesale distribution, which are not among public television's strengths. By carefully planning a

phased entry into the home market, in partnership with distributors who can test the marketplace and take more of the risks, public broadcasting will be able to evaluate more extensive plans, like a video label. At the same time, those existing public broadcast supporters who own VCRs and disc machines could well be interested in purchasing their favorite programs. Subject to clearing of rights, there appears to be no reason why these consumers should not be afforded the chance to vote with their pocketbooks directly through the institutions that brought them the programs in the first place.

CHAPTER SEVEN

Videotext Services

Overview

Broadcasters, publishers, and communications utilities are becoming increasingly interested in a new group of information technologies know generically as videotext. Videotext systems permit delivery of graphic and textual information to the home via broadcasting, telephone, or cable for display on a TV set equipped with a special decoder.

The two principal forms of videotext are teletext, based upon broadcast delivery, and viewdata, which uses narrow band telephone lines. Systems using one-way or two-way cable television or a combination of technologies are also possible. Most videotext systems have differing capabilities in such areas as how many "pages" of information can be delivered; what characters, colors, and graphics can be used; how long it takes to retrieve the information; and whether the system is interactive.

Videotext may be used for simple information retrieval, video gaming, advertising, education, captioning, transaction services and, in a more advanced state, electronic mail and home computing.

About 20 nations are now developing videotext, but only in England are there substantial videotext operations today. The BBC and the ITV companies provide the Ceefax and Oracle teletext services to about 50,000 subscribers. The British Post Office operates Prestel, a telephone based viewdata system serving about 2,000 subscribers. The French, Canadians, and Japanese are also active videotext developers. In the United States about half a dozen videotext experiments are being carried out by CBS, General Telephone & Electronics (GTE), AT&T, Knight-Ridder, local broadcasters, and several smaller firms. The prospect for videotext development is highly uncertain, owing to several factors. Videotext technology is

immature. The cost of home decoders is now quite high—ranging from $500–$2000 per unit, although these figures should drop substantially in the next two years. Until a clear demand for videotext service emerges, manufacturers will not be able to produce terminals in sufficient quantity to bring their cost under $100. Much of the current videotext developmental activity is concerned with refining and improving the technology.

Because very few videotext systems are available to the public, it is difficult to gauge consumer acceptance. What limited usage data exist indicate that subscribers are most interested in such information as horoscopes, sports results, and simple computer games. It is also not yet clear whether videotext systems can compete effectively with more sophisticated information retrieval systems now serving the business market.

Videotext growth will be helped if developers are able to establish common technical standards. While the British videotext systems share technical characteristics, compatability has not been achieved among the British, French, Canadian, and Japanese systems. Each developer is competing to entrench his own system and each is actively marketing to other countries interested in videotext. Committees of the International Telecommunications Union (ITU) are preparing international standards. The U.S. Electronics Industries Association will propose teletext standards of the FCC in 1980. Whether overall U.S. videotext standardization will result from industry agreements, FCC action, or both, remains unclear.

How videotext develops in the U.S. will also depend on the resolution of a variety of complex and quite unique regulatory questions. The FCC and other government agencies are only just beginning to focus on issues concerning the ownership, licensing, and structure of teletext and viewdata operations as well as potentially troublesome content regulation issues.

Summary of Recommendations for Public Television

In view of the unresolved questions that remain regarding possible videotext services and the expected period of continuing experimentation with the technological, marketing, and regulatory approaches to text services, we do not recommend a single approach for public television in this new industry. The last section of this industry report is therefore more of an examination of possible roles for public television in the ongoing development process of videotext services, rather than an explicit strategy. Among those roles are:

- A national teletext service to be distributed by PBS to stations on a statewide or marketwide basis.
- Provision of information by stations or PBS to commercial teletext operators.
- Operation of a teletext service using the full TV channel bandwidth on second channels in a market.

Each of these options is largely dependent upon the full range of experiments in videotext underway here and abroad. We support continued and more extensive experimentation by public television in videotext, particularly focusing upon those types of service associated with public television's mission, and with those nonprofit services such as education that may not attract early commercial support.

Videotext Characteristics and Operation

A group of new information technologies generically known as videotext has attracted considerable attention in the communications industry during recent years. In simplest terms, these systems deliver graphic or textual information, using the television set as the display device. Typically, the information is transmitted via an existing communications system—a broadcast station or the telephone network, for example—and is retrieved by the user with a special device attached to or built into a television set.

It has been recognized for many years that established mass distribution systems like broadcasting and the telephone network theoretically were capable of conveying considerably more information into the home. However, economic, technical, and regulatory limitations generally inhibited their expansion into these new areas. More advanced distribution systems with even greater information carrying potential such as cable television faced similar constraints. Important technological advances in computing, digital transmission, and miniaturization, have gradually chipped away at these traditional barriers.

An equally important reason for this growing interest in videotext involves marketing considerations. Information distributors see in videotext a potential to expand or shield markets because it will increase use of their transmission systems. Information packagers and providers such as newspapers, news organizations, publishers, or firms that have assembled large databases also see in videotext not only the opportunity for new markets but also a means to pro-

tect their existing businesses. Given the potential home market for videotext services, manufacturers of television sets, terminals, and other electronics components can also envision new business opportunities.

These factors aside, no widespread consumer demand for the service exists. In only a few places in the world is videotext actually available to the public. Business and governmental needs for information retrieval services are growing rapidly. But over the short term these needs can be met by specialized information carriers whose businesses, spurred by changing regulatory policies, are expanding vigorously.

Perhaps as much as anything, it is the prospect of tapping the vast consumer market through what some experts feel is a wholly new medium, of creating a universal database providing low cost access to information for leisure, for education, for personal business and much more, that drives the interest in videotext.

At the outset, it is important to understand in some detail what is meant by "videotext" and its two principal forms, "viewdata" and "teletext."

A generally accepted definition of videotext is that of Michael Tyler, a videotext authority:

> ". . . systems for the widespread dissemination of textual and graphic information by wholly electronic means for display on low-cost terminals (often suitably equipped television receivers) under the selective control of the recipient, using control procedures easily understood by untrained users."[1]

Tyler goes on to distinguish five categories of videotext service.

1. *Narrowband interactive systems* Known as *videotex*[2] or *viewdata,* these systems use the telephone or similar networks to distribute information to users at relatively slow speeds (2400 bits per second). Viewdata systems are two-way; hence, users may directly interact with a computer database and access a virtually unlimited amount of information.

2. *Broadcast teletext* refers to systems in which textual and graphic information in digital form is inserted into unused portions of the broadcast television signal (known as the vertical blanking

[1]M. Tyler, "Videotext, Prestel and Teletext—The Economics and Politics of Some Electronic Publishing Media," *Telecommunications Policy*, March, 1979.
[2]We will use the term viewdata, rather than videotex when referring to wired systems to avoid confusion with the broader generic term, videotext.

interval), transmitted, and retrieved by the user. Teletext systems are inherently one-way. Information is transmitted in a continuous cycle or loop. With a terminal device the user picks off the desired information as it passes. Typically, 100–300 pages of information are broadcast in several seconds. Theoretically more information can be inserted into the cycle, but present storage limits in home terminals mean additional pages cause a delay of several minutes in access time, which would probably be unacceptable to most users.

3. *Wideband broadcast teletext* or *cabletext* systems operate on the same principle as teletext, but utilize a full video channel for information transmission and thus can hold more information. A wideband system could be implemented using a CATV channel, or an unused VHF or UHF over-the-air channel. A full channel system can transmit 1,000 pages of information with an average waiting time of less than two seconds.

4. *Wideband two-way systems* are another category that could be employed using two-way cable systems. Systems such as TICCIT in Reston, Virginia and QUBE in Columbus, Ohio have demonstrated the feasibility of this approach. However, such "subscriber initiated" interactive systems are currently quite expensive and it may be some time before they are economically attractive.

5. *Hybrids* include a number of approaches to videotext which combine different technologies, for example, telephone/CATV, or telephone/broadcast hybrids. The telephone system could be used for an upstream link to allow users to interact directly with a database. The cable or broadcast channel could then be used for transmitting selected information back to the user's terminal. These hybrid systems would be less expensive than two-way wideband systems and would have the performance advantages of interactive systems.

Other technologies could also be used for videotext service. For example, communications satellites using either a full video channel or a portion of the channel could provide national distribution of videotext to CATV systems, broadcast stations, and even translators. A direct broadcast satellite (DBS) system could distribute videotext directly to the home. DBS videotext might, for example, be a desirable approach to distributing electronic newspaper services. Use of fiber optic systems for videotext distribution is yet another approach now being tested in Canada.

In short, many technologies and distribution modes might be applied to videotext. Obviously, the choice will affect cost and performance characteristics.

To access a videotext service the viewer uses an adapted TV and a 12–16 button keypad device that looks like a calculator (more sophisticated systems would use a typewriter style keyboard). With a teletext system the viewer presses a button on the keypad and an index appears on the screen. On the index are numbered subject categories, e.g., 1-weather, 2-news. The viewer presses the desired number and after a short pause either a lower-level index (e.g., showing sports news options by type of sport) or the information requested would appear.

Present viewdata systems operate in much the same way. However, the contents are organized in a more detailed "tree-structure" format. To obtain information on local restaurants, for instance, a user would select an entertainment and dining guide from the index of information categories, choose "restaurants" from a listing of topics contained in the guide, and find that restaurants are indexed by location, by nationality, and by cuisine. Keying in the number corresponding to one of the indexes, the viewer would then see a listing of restaurants by cuisine. For further information, another page or location number might direct the user to a review of that restaurant.

Experience to date has demonstrated that this method of information retrieval can be cumbersome. However, compared to more sophisticated business and educational information retrieval systems, the tree-structure appproach does offer relative simplicity. To use many existing retrieval systems would require special training; hence, they are not easily adapted to a consumer service. As videotext services become established, it is likely that improved retrieval techniques will be developed.

Videotext specialists point to six general performance characteristics which affect the relative acceptability of a videotext system.

1. *Interactive capability* Can the user interact with the central source of information? Can he search out or browse through databases for information in which only he is interested? Videotext systems such as Prestel in England have this capability. Teletext systems do not.

2. *Access time per page* How long does it take the requested information to appear on the user's TV set or display terminal? The typical waiting time on a teletext system with 100 pages of information is about 12 seconds. Generally, if the amount of information or "pages" is increased, the waiting time increases. (There are, however, several methods for reducing waiting time on teletext.) On a viewdata system containing thousands of pages the waiting time is

shorter, typically only a few seconds before the information starts appearing on the screen.

3. *Information per page* How much information can be presented on one videotext page? British videotext systems can accommodate 960 characters (24 lines, each containing 40 characters), or roughly the equivalent of two paragraphs in a newspaper. American videotext systems are expected to be similar in size.

4. *Character set available* What characters (numbers, letters, etc.) can be used? Most current systems provide upper and lower case letters and numbers. Some, like the Japanese systems, are based upon unique language requirements. The French and Canadian systems can use both Latin and Cyrillic alphabets as well as accent marks. The available character set is important because of international standards, marketing considerations, and special user requirements.

5. *Display quality* What are the color and graphics capabilities of videotext systems? Both are thought to be important in serving the home market and for such commercial applications as advertising. Some systems, such as Telidon in Canada, have quite advanced graphics capabilities. The Canadian and French systems also have better color definition than the British system. Equally important is page design. What should a page look like, how should the information be organized? It is becoming evident that a new kind of visual design may be necessary in order to communicate effectively through videotext.

6. *Information base size* How much information or data can the system accommodate? Teletext systems, under any realistic scenario, are limited to a relatively small database—under 5,000 pages —and existing teletext systems provide only 200-400 pages. The British Prestel system, on the other hand, now contains over 150,000 pages of information. In theory there is no limit to the amount of information a viewdata system can accommodate.

There are many potential applications of videotext. In general, videotext in the home, office, or in institutions might be used for simple information retrieval, video gaming, and transaction applications, advertising, education, captioning or other "translation" services, and for services ancillary to broadcasting. At a more advanced stage of development or in combination with other technology, videotext could well involve home computing with access to large databases, large-scale electronic publishing, electronic mail, and hard copy print-out services.

Within these general service categories, hundreds of specific services can be provided. Yet, to date the British teletext and viewdata services—the only videotext services that have been available to the general public for any significant period of time—have offered primarily simple consumer and business information retrieval services. Users have shown greatest interest in horoscopes, sports scores, and computer games. Over time the nature of the services offered via different videotext systems and the use of those services will change as information providers and consumers learn more about the capabilities of the technology.

Today some 20 nations (and in some cases several different entities within a country) are either operating, experimenting with, or planning videotext service. Still, videotext generally remains in its infancy as a public service. The Canadians, British, and French have been most active in videotext development, although in the past two years several U.S. commercial and public broadcasters, publishers, utilities, and several miscellaneous private firms have tentatively entered the field. Most U.S. developmental activity remains focused on hardware testing, although over the next several years the number of limited marketing tests will increase significantly. Because of the small number of people actually receiving a videotext service—anywhere—market acceptance of videotext is a major unknown. However, this lack of information has not deterred the British, French, and Canadians from aggressively marketing their videotext systems abroad. The U.S. is generally regarded as the most substantial market for videotext.

In both North America and Europe, major manufacturing firms are now developing videotext hardware systems and related components. In the U.S., virtually all major TV manufacturers and many components firms are involved. Among them are Oak Industries, Zenith, Motorola, North American Philips, Texas Instruments, General Instruments, Sony, and RCA. However, although manufacturers appear bullish on long-term videotext prospects, present activity remains cautious. Without a strong commitment by manufacturers and thus the availability of low-cost terminals for the home, videotext development will be greatly slowed.

International Videotext Developments

Although many nations are in the process of implementing videotext (see Table 7-A), the British, French, Canadians, and Japanese are, as

Table 7-A U.S. and Foreign Videotext Development

COUNTRY	SYSTEM	TYPE	OPERATOR	COMMENTS
U.S.	Viewtron	Viewdata	Knight-Ritter	Spring, 1980 trial in Miami, Florida area . . . 50 terminals . . . 200 homes . . . AT&T participating.
		Viewdata	GTE	Firm holds U.S. Prestel rights . . . Recently acquired nationwide packet switching network . . . Evaluating home market.
	Green Thumb	Viewdata	U.S. Dept. of Agriculture	Limited trial in 1980 . . . Agricultural information to Kentucky farmers.
	The Source	Viewdata	Digital broadcasting	Information retrieval . . . electronic mail . . . time sharing . . . 3000 subscribers in early 1980.
	KMOX-TV	Teletext	CBS	Technical trials since spring, 1979 in St. Louis . . . Have used Ceefax and Antiope systems.
	KCET-TV	Teletext	Comm'ty TV of Southern Calif.	Los Angeles public TV station . . . Technical trials with Antiope . . . Software tests planned.
	KSL-TV	Teletext	Bonneville International Corp.	Technical tests since 1978 in Salt Lake City, Utah.
	Infocast	Teletext	Digital Broadcasting Corp.	Data, electronic mail distributed via packet-switching and FM subcarrier . . . Operating in Washington, D.C. area.
	Infotext	Teletext	Micro-TV, Inc.	System being marketed to CATV, MDS operators, broadcasters.
	Cabletext	Cable Teletext	Satellite Syndicated Systems	Service to cable systems via RCA satellite planned for mid-1980.
	Videotext	Teletext	Oak Industries	Test planned.

	WETA-TV	Teletext	WETA/AMC/ NTIA/CPB	Technical, software tests planned for fall, 1980 in Washington, D.C.
U.K.	Prestel	Viewdata	BPO	Public service from late 1979 . . . 165 IPs . . . approx. 2000 users . . . 150,000 pages.
	Ceefax	Teletext	BBC	Public service for several years . . . Estimated 50,000 sets in use for both systems.
	Oracle	Teletext	IBA	
France	Antiope	Teletext	TDF	Closed user stock and weather services underway.
	Teletel	Viewdata	DGT	Trials in early 1980 in Ille-et-Villaine and Velizy.
Holland		Viewdata	VNU (publisher)	Public service planned in 1980.
	Viewdata	Viewdata	PTT	Closed user business service began in 1979 . . . Planned public service in 1980–81.
Japan	CAPTAIN	Viewdata	PTT	Tests began in 1979.
	HI-OVIS	Interactive Cable	MPT	Tests since 1978.
Germany	Bildschirmtext	Viewdata	Deutsche Bundes-post	Plan market trials in 1980 in Dusseldorf and Berlin . . . Adaptation of Prestel system.
	Bildschirmzeitung	Teletext	German Newspaper Assn.	Plans not announced.
	Videotext	Teletext	TV Networks	Trial with 10,000 users in 1980–81.
Canada	Vista	Viewdata	Bell Canada/Torstar	Market trial in 1980 with Vista and Telidon terminals . . . IPs.
	Ida	Viewdata	Manitoba Telephone	Tests in 1980 using 100 terminals.
	Elie	Viewdata	Dept. of Communi-cations	Tests in 1981 using fiber optics.

Table 7-A (Continued)

COUNTRY	SYSTEM	TYPE	OPERATOR	COMMENTS
Canada		Teletext	OECA	Trial involving educational applications since late 1979.
		Viewdata	Alberta Telephone	Market trial in 1980.
		Viewdata	BCT	1980 trials in Vancouver with Telidon terminals.
Belgium		Viewdata	BRT	Studying standards.
Italy		Viewdata	PTT	Commission studying.
Finland	Telset	Viewdata	Telephone/ publishers/ utilities	Limited trial underway.
Norway		Viewdata	PTT	Small scale trial with IPs planned.
Spain		Viewdata	CTNE	One-year trial underway.
Hong Kong		Viewdata	PTT	Service being studied.
Singapore				Has obtained Prestel rights.
Switzerland		Viewdata	PTT	System in planning stage.
Australia		Viewdata/ Teletext	ABC/PTT	Under study.
Sweden	Datavision	Viewdata	PTT	Technical tests.
	Text-TV	Teletext	Sveriges Radio	1979 trials.

Source: Communications Studies & Planning, Ltd.; published sources; and interviews.

we have noted, furthest along. Following is a brief description of videotext developments in those countries.

Great Britain: Ceefax/Oracle (Teletext) The British were the first to develop working teletext systems. The BBC first experimented with Ceefax in the early seventies, principally as a means of subtitling for the deaf. Work on the ITV teletext system Oracle (Optional Reception of Announcements by Coded Line Electronics) began shortly thereafter. In 1974 the BBC, IBA, and the British Radio Equipment Manufacturers Association (BREMA) agreed to common technical standards, thus ensuring that a set adapted for one service could also receive the other. In 1974, the Home Office authorized the BBC and the ITV companies to conduct two-year teletext experiments. In 1977, the Home Office confirmed that the BBC and ITV could operate permanent teletext services.

Both British teletext systems are operated as free services. Any person with a terminal-equipped set can receive each service. (A subscriber to Prestel, the British Post Office's telephone-based viewdata system, can receive the teletext services, but a Ceefax/Oracle subscriber cannot automatically receive Prestel.) Additionally, both teletext services are operated as broadcast services; that is, the BBC and ITV companies exercise total editorial control over the information distributed. (In teletext's early days, attempts were made to have editorial control divided among broadcasters, news publishers, and others, on the grounds that teletext was a form of electronic publishing. This argument was rejected by the government, however.)

The BBC offers Ceefax on both BBC 1 and BBC 2. Both Ceefax and Oracle will be expanded nationally over the next two years. Each system began with fewer than 100 pages of information but by 1980 each had about doubled.

Initially teletext terminals were not a part of the television receiver. In 1976, receivers with built-in decoders came on the market. In England, almost half of all TV sets are rented. The rental for a teletext-equipped set ranges from $21 to $35 per month, or $4 to $6 more than rental of a standard set. Purchasing a teletext-equipped set can increase the cost by $400 to $500, although the British claim the price will drop as volume increases.

In October, 1978 there were 7,000 teletext sets available for use and by early 1980 about 50,000.[3] The BBC claims the number of

[3]No figures are available indicating the number of sets actually being used, as opposed to those available in showrooms or rental agencies.

teletext-equipped sets is increasing by 3,000 per month, and projects 300,000 sets by early 1981. (Annual British set sales are about 1.8 million.)

The information offered by the two services is generally similar—a combination of news, weather, consumer games, sports results, transportation schedules, financial information, and the like. The Ceefax information is compiled, edited, and continually updated by a team of 16 editors in the London office. The Oracle service is compiled by Independent Television News and London Weekend Television. However, the two services do reflect the different missions of the noncommercial BBC and the commercial ITV companies. BBC, for example, offers a sizable number of pages of background information on news stories. Oracle, on the other hand, is somewhat more oriented toward entertainment. The ITV companies are interested in commercial applications, and although paid advertising is not yet permitted, experiments with advertising are being carried out.

The BBC uses one computer for input to the database and two for output. It now has under development a printer which will provide hard copy of Ceefax information on demand.

Subtitled caption services for the deaf on both teletext systems began in late 1979, although not all programs are captioned. Both operations are attempting to develop a live captioning capability with palantype, a kind of shorthand machine used in court reporting.

Technically, the two teletext systems are identical. Both transmit on lines 17, 18, 330, and 331 of the 625-line PAL TV system at a data rate of 6.9375 Mbit/s. Each system is capable of using six colors—red, green, blue, yellow, cyan, and magenta. Each page can accommodate 24 rows of standard sized characters, and each row can have up to 40 characters. Thus, each page can carry about 150 to 200 words.

Each system has the potential to carry 800 pages of information although, as previously noted, using so many pages would normally produce an access waiting time in excess of several minutes.

The number of pages has been expanded beyond the initial 100 through use of self-changing pages and time-coded pages. In the former, the content of the page—for example, weather information—is automatically altered after allowing sufficient time for it to be read. With time-coding, different pages can be transmitted on the same page number at different times of the day. The viewer can

access the page by presetting his terminal, provided he knows the transmission time.

In addition to the development of live captioning and a hard copy printer, both systems are planning further refinements of their services. Among the most important are regionalization of the services and the development of what is known as "telesoftware," the capability to transmit computer software which programs a microprocessor in the receiver and permits storage of a larger quantity of information.

Prestel (Viewdata) Prestel was first developed by the British Post Office (BPO) in the early 1970s.[4] The BPO's objectives were twofold: to develop a universal computer database that consumers could access; and to increase usage of the telephone system (which has high penetration but low use) and thus boost revenues.

Initially the Post Office viewed itself as operator of the technical system as well as editor of the databases submitted by a variety of information providers (IPs). For both political and practical reasons the Post Office decided to abandon the editor's role and run Prestel as a common carrier. The BPO runs the system and insures access to it while IPs provide their own databases directly to the computer in the manner of their choosing (within the confines of certain general standards). IPs are responsible for the quality, legality, and accuracy of the information, as well as for updating information.

The operation of Prestel involves four distinct groups in addition to the end user, the consumer. The BPO operates the central computer that stores the information and transmits data via its telephone lines. The IPs, ranging from major publishing firms to retailers, provide information in the hopes of "selling" it to consumers or businesses, and maintain their information through direct access to the central computer. Some IPs have fewer than 100 pages, others as many as 5,000. TV set manufacturers build and sell wholesale terminal-equipped sets or adaptors. The TV rental companies rent and install sets in the home.

To receive information, the Prestel user accesses the computer by punching number codes on a calculatorlike keypad. He calls up index pages from the computer and punches in additional codes to

[4]For the first several years of its development, the service was called Viewdata. That term is now used as a generic description of narrowband wire-delivered services, and Prestel the specific BPO trade name.

track down the desired information. The information is relayed by the computer and within a few seconds begins appearing on the screen in a crawl.

Limited Prestel public service began in September 1979, to residential and business users in London. (About three million telephone subscribers are in the local call area.) Earlier, a test service was provided to a limited number of terminals but, because of delays in set production, the test phase actually overlapped with the offering of public service. At the end of 1979, about 1,900 Prestel sets were in use and approximately 165 IPs were offering over 150,000 pages of information. The majority of Prestel subscribers are business users or consumers who had been part of the test phase market research sample.

The consumer incurs three costs in obtaining information from Prestel. First, he must rent or buy a Prestel set. As noted earlier, the cost is about double the cost of a regular set. Ultimately, it is hoped the cost will add only about 15 percent to the price of a standard set. To use the service the consumer must pay a six-cent access charge, the local telephone call. He also pays time charges of about six cents per minute in business hours and two cents in off-prime hours. (The service is available 23 hours per day.) Finally the consumer pays for the pages actually accessed. The Post Office allows IPs to set page prices up to about $1.00. Current practice is for IPs to provide advertising and routing pages free, residential and consumer pages for 1 cent to 6 cents, and business-directed pages from 10 cents to $1.00.

Two recent rules of thumb are that it takes a user four routing pages before reaching an information page and that the average total cost in off-peak hours of a transaction is about 6 cents to a residential user and 25 cents for a business user.

One assumption is that the average Prestel session—i.e. several transactions—for a residential user involves accessing two to three pages. Thus, he will be paying about 20 cents, roughly the cost of a newspaper.

All charges are recorded by the computer and billed and collected by the Post Office. It then deducts 5 percent from the monies distributed back to IPs for bad debts and administration.

The IP also pays for the right to do business via Prestel. He is levied an annual "membership" fee of $8,800 (for which he is assigned a three-digit identification code) and is also charged a fee of $8.80 per page of information in the database. This means an IP with a large database—say 1,000 pages of information—will spend

$15,000 to $20,000 annually just for the right to be able to sell via Prestel. On top of this come the costs of his own terminals, accessing the computer, and maintenance of the database. One estimate is that the annual cost of maintaining and inputting a single page ranges from $40 to $70 per year.[5]

Among the Prestel IPs are newspapers and magazines such as the *Financial Times* and *The Economist;* news agencies (AP, Dow Jones, Reuters); retail and service firms; government departments; nationalized industries; and large private companies.

Information about which databases offered by IPs are most popular to subscribers has generally remained confidential. However, information made public in mid-1979 during the test service indicated that the two most consistently popular offerings were those with the best selection and quantity of computer-based games. In general, the most popular Prestel information has been horoscopes, sports scores, games, and business news and services.

Although Prestel does not offer a full capability for subscriber-to-subscriber messaging, some messaging and transaction services have been tried. Some mail order transactions with the subscriber keying his credit card have been tested. Likewise, charitable donations can be made by accessing a particular page. A limited amount of messaging from users to IPs requesting more information via mail, for example, has been done as well as IP-to-IP communication.

A sizable body of articles and reports on the Prestel experience to date is already developing—much of it speculative and critical. However, it is probably unwise to draw too many conclusions about Prestel—especially in connection with U.S. videotext development—based on only about a year's experience. Some of the aspects of Prestel development that are of interest include:

- The cost of Prestel terminals and their availability remain a major question—particularly in terms of the home market. Until manufacturers see a substantial market, terminal costs will remain high, but without lower cost terminals the market may not develop.
- The structure of the Prestel database has proven to be a very complex question. IPs must design their information with extraordinary attention to the mental processes they assume the user will employ when searching for information. IPs are devoting a great deal of attention to such problems as how to direct the

[5]In actuality, most information providers are still paying lower BPO rates first established for the Prestel test service. The new rates will take effect in September 1980.

user as efficiently as possible to the desired information and how to send him on to related information.

- Because of the common carrier structure there are a number of pertinent developments involving IPs. Several types of IPs have evolved: closed user IPs who provide restricted information, primarily to business users; regular IPs offering their own services to the public; and umbrella IPs who control a large number of pages—as many as 5,000—and, in effect, lease their pages (and Prestel expertise) to smaller IPs in a manner not unlike a U.S. resale carrier.
- Despite the perception of the Prestel database as virtually unlimited, in fact there exists a shortage of space—more potential IPs exist than can now be accommodated. Although the BPO is adding more computers as it expands nationally, because it wants subscribers to be able to access a computer with a local call, the new computers in different cities contain the same databases.
- Some feel user charges are too high to allow Prestel to become a regular source of information. For the cost of a typical Prestel session, the consumer could purchase a lot more information in a newspaper. Some argue that present costs discourage Prestel use. One alternative being considered is a basic monthly subscriber charge.
- A variety of intriguing issues have arisen over the content of the databases. Prestel IPs are now attempting to develop a voluntary code of conduct to deal with such questions as marketing and editorial standards, the distinction between advertising and information, and ethical standards. For example, one troublesome question results from the fact that the designers of the database—the IPs—have a vested interest in "leading" users to the IP's own pages and not necessarily where the user might want to go as he searches down information.

Japan The Japanese have been experimenting with videotext since the early 1970s. Videotext-related experiments were conducted via one-way or two-way cable in connection with the Community Communications Information System (CCIS) in Tama New Town and HI-OVIS (Highly Interactive Optical Video Information System) at Hifashi Ikoma in Nara Prefecture in the mid-1970s.

In 1977 the Ministry of Posts and Telecommunications began development of CAPTAIN (Character and Pattern Telephone Access Information Network), a viewdata system.

A CAPTAIN field trial was launched in Tokyo in December, 1979. The experiment involves about 1,000 terminals, a database of 100,000 pages and over 100 information providers (including newspapers, ad agencies, stores, publishers, travel agencies, public agencies, and broadcasters).

Users equipped with a 16-button keypad access the computer via telephone. The information is reached either through tree searching or by selecting the code directly from a published directory.

Second phase tests will involve experiments with hard copy printers and cassette recorders for storing information at the user site. The CAPTAIN experiment will run until spring, 1981. No plans have been announced regarding a date for public, commercial service. It is anticipated users will pay a page charge, a charge for accessing the computer, and another for the decoder/adaptor.

One of the major problems faced by the Japanese is the large number of ideographs or characters used in Japanese writing (Japanese newspapers use more than 4,000 characters.) This language factor would normally make it necessary to have a decoder memory capability far in excess of what is required in, for example, a Prestel or Ceefax decoder and would greatly increase decoder cost. The solution to this problem has been to convert the data into characters/patterns in a generator at the computer instead of at the terminal. A refresh memory in the terminal then scans information and in effect reconverts it.

In addition to the CAPTAIN experiment, NHK is developing a teletext system (the CAPTAIN terminal can be used with teletext), as is Asahi Broadcasting. Nippon Telephone and Telegraph is reported to be developing a viewdata system. The HI-OVIS interactive cable experiment is also continuing.

France In France, viewdata and teletext systems have been under development since the early 1970s. The prime forces in what are emerging as highly ambitious videotext plans for the nation are the French PTT (Secrétariat d'Etat aux Postes et Télécommunications), the agency responsible for telephone service, and the CCETT (Centre Commun d'Etudes de Télévision et de Télécommunications), a research center jointly financed by the PTT and (TDF), (TeleDiffusion de France.)

TDF's teletext system, Antiope (l'Acquisition Numérique et Televisualisation d'Images Organisées en Pages d'Écriture) has been tested for the past two years in Lyons and Paris with closed user group services. Antiope-Bourse provides financial and stock

market information to banks and Antiope Meteo offers weather information to a variety of public and private entities. The Antiope system has a number of attractive features. It can be used for TV or FM teletext, viewdata or wideband cabletext. It is adaptable to both the European 625-line systems and the American 525-line television system. In another configuration Antiope can be used to transmit information over the bandwidth of an entire TV channel when programs are not being broadcast.

The PTT and TDF have also developed the Teletel viewdata system which operates over the Titan Packet Switching Network and which is compatible with Antiope. A Teletel trial will be conducted in Illes-et-Villaine beginning in late 1980. Each telephone subscriber will be given a terminal (which includes a 9-inch display screen and keypad). The Teletel database will incorporate all telephone directory listings. In 1981 the PTT plans to begin a ten year project to replace all telephone directories with Teletel on a region-by-region basis. The French believe this will be more economical than maintaining printed directories and directory assistance. A second viewdata trial involving a variety of information providers will be inaugurated in Velizy in 1980.

Ultimately, the French envision a totally integrated videotext system with the user having both teletext and viewdata capability in a common terminal. They also plan to incorporate such capabilities as off-line perusal of data, subscriber generation of graphics, and subscriber-to-subscriber communication.

Canada Canadian governmental agencies and private firms have become increasingly active in the videotext field. In the spring of 1979 the government announced a $9 million commitment to videotext development and experiments. Private firms are expected to make additional financial commitments. Over the next four years several tests and experiments are planned.

Most of the activity is focused on the development of the Telidon videotext system. Telidon was created by the Communications Research Center of the Canadian Department of Communications and is generally regarded as one of the most sophisticated videotext hardware systems in the world. The terminal can be used in both broadcast and wire transmission and can be adapted for use with other systems such as Prestel and Antiope. Because Telidon employs a geometric rather than the British mosaic approach to graphics, it can achieve much higher quality. The more sophisticated units can serve as microcomputers. The terminals can also be used to communicate directly with other terminals without the assistance of

the central computer. One variation of the Telidon unit actually permits writing on the screen by the user.

Norpak, Ltd., a manufacturer of computer display equipment, is producing the Telidon terminals. The simpler versions have a unit cost of $1,000. Mass market models are projected to retail at about $200 to $250.

Among the field trials and experiments planned or under way: (1) A $10 million Telidon field test in Toronto involving the Department of Communications and Bell Canada is scheduled to begin in September 1980, and will involve about 1,000 terminals (675 purchased by the government and loaned to Bell and 325 purchased by the telephone company). Approximately 30 information providers will offer travel schedules, news, weather, classified ads, and teleshopping, and other information, totaling about 100,000 pages. (2) Rogers Telecommunications Ltd., a Toronto cable system, is planning market trials to test the commercial potential of both Telidon and a version of the British Ceefax system. (3) In February, 1980, the Department of communications and the Manitoba Telephone System will conduct a $5 million field trial using Telidon and fiber optics in a small western community. Approximately 150 homes will receive telephone, television, and radio service, as well as two-way shopping and information services. The experiment, known as Project Ida, will also test another videotext system, Omnitext. (4) Ontario Educational Communications Authority, an agency of the provincial government, is conducting a series of Telidon tests on its educational TV network. Initially OECA will test one-way transmission and then progress to interactive information retrieval and even computer-based learning systems. (5) A smaller scale (115-home) test in late 1979 in Calgary primarily involving experiments by Alberta Government Telephone with Harris Corporation's digital Vidon telephone system, will also include Telidon operations.

In addition to the Telidon experiments, Bell Canada and Torstar (owner of the *Toronto Star*) are developing and testing their own videotext system, VISTA, in Montreal, Toronto, and Ottawa.

U.S. Videotext Developments

Over the past two years domestic interest in videotext has increased, particularly in the private sector. Although no U.S. videotext systems are operating on any large scale, several hybrid services are in operation, and a number of companies are experimenting with

videotext. Following is a summary of these activities generally based upon information available as of January, 1980:

KSL-TV Bonneville International Corp. (Teletext) The first experiments with a broadcast teletext system in the United States were initiated by Bonneville International Corp., licensee of KSL-TV, Salt Lake City, Utah. KSL-TV received special temporary authorization from the FCC in April 1978 to begin tests in June 1978. Since the first authorization, KSL-TV has received several extensions from the FCC to continue tests.

The KSL system is similar to the British Ceefax system, and in fact KSL has worked closely with the BBC on the project. KSL has been transmitting about 115 pages of information 20 hours per day. While the test originally involved four homes with TV sets equipped with decoders manufactured by Texas Instruments, for much of the experimental period only two sets were in operation because of equipment problems.

The KSL system consists of a General Automation mini-computer, a VIT insertion unit, a Tektronix test signal generator, and a standard electronic keyboard. The teletext signal is carried on lines 15 and 16 of the vertical blanking interval. Each page transmitted consists of 20 rows with 31 or 32 characters per row. Bonneville reported in August, 1979, that it has spent approximately $100,000 on the experiment.

KSL's data base is relatively simple, consisting of airline schedules, stock quotations, news, recipes, restaurant listings, and question and answer games. KSL has also included sample advertising pages with crude graphics and KSL management has expressed particular interest in developing this application.

In addition to the basic operation, KSL has experimented with a system of page and time codes that when signaled by the subscriber interrupts the teletext cycle with the requested page. This system can theoretically reduce the cycle time and thus permit a greater number of pages.

KSL management has stated that it intends to continue experimentation indefinitely and would consider regular operation of the system if the FCC authorized it.

KCET-TV, Los Angeles (Teletext) In October 1979, KCET-TV, Los Angeles, became the first public television station to experiment with a teletext system. KCET received an FCC special temporary authorization to conduct transmission tests using the Antiope system. The one-month test was the first U.S. teletext test by a UHF station. Five decoders were used and KCET officials

termed the experiment a "preliminary test" and indicated they may mount a more substantial follow-up in the future in which they would experiment with different types of software.

KMOX-TV, St. Louis, MO—CBS, Inc. (Teletext) In March 1979, under FCC special temporary authorization, CBS began technical tests at its station in St. Louis. It uses lines 13, 14, 15, and 16 of the vertical blanking interval (VBI) for Ceefax/Oracle, Antiope, and the Telidon systems. All have been modified for use on the U.S. 525-line system. Forty receivers were used at 23 test sites within the station's Grade A contour.

CBS has stated that in its initial phase, interference problems, particularly on older tube-type TV sets, did appear when transmitting on lines 13 and 14. TV repair shops also complained of interference.

According to CBS, a few tentative conclusions resulted from the test: to reduce waiting time more than two VBI lines are needed; to provide more space for teletext data, station test and reference signals on the VBI should be multiplexed; waiting time could be reduced by inserting commonly used pages in the cycle more frequently, or by developing decoders which could store more pages of information; a two-state system is possible by broadcasting a more powerful signal on line 15 and 16 to reach all homes and a less powerful signal on 13 and 14 to reach homes closer to the transmitter.

CBS intends to present its findings to the EIA Standards Committee working on teletext standards. In December 1979, CBS began testing network teletext transmissions over both landlines and a Western Union satellite.

WETA-TV, Washington, D.C. (Teletext) A pilot field test of a broadcast teletext system is planned in the fall of 1980 at WETA-TV, the public television station in Washington, D.C. The trial, which will be supplemented by laboratory studies, will be conducted by the Alternate Media Center, with WETA's cooperation. The 24-month project is estimated to cost $850,000. Funding will be provided by the Corporation for Public Broadcasting, NTIA, the National Science Foundation, and the Department of Health, Education and Welfare.

AMC intends to place approximately 40 reception terminals in households and 10 in public places. Additional decoders will be purchased by public agencies and private organizations in the Washington, D.C. area. The database will contain 100–300 pages of information, many of which will be changed daily. The service will be

transmitted 18 hours a day on lines 15, 16, 17, and 18 of the vertical blanking interval. In its planning study AMC contacted a number of possible local information providers who expressed interest in participating, including *The Washington Post*, the D.C. government, local neighborhood associations, and several federal agencies.

The objectives of the trial include gathering data on the usage of information services delivered via teletext, evaluating the effects of such services, determining the relative acceptability of different classes of service, providing cost data, and analyzing problems associated with arranging a teletext information service. Public television officials associated with the project are also interested in examining methods of supporting the service. Several options include allowing outside organizations to underwrite pages and placing the teletext index in the station program guide, thus forcing viewers to become a member of the station in order to fully partake of the service.

General Telephone & Electronics (Viewdata) In spring 1979, GTE announced that it had acquired exclusive U.S. marketing rights to the British Prestel system. (The agreement also provides for a nonexclusive Canadian license.) GTE has established a Viewdata Division and is conducting technical tests. Later it plans to market the system experimentally to business and possibly home consumers.

GTE also has acquired Telenet Corp., making Telenet a wholly-owned subsidiary. Telenet, with revenues of $8.9 million in 1978, is a leader in the field of packet switching. Its switched data communications network permits subscribers to exchange data communications throughout the U.S. and in several foreign countries. Telenet has 89 switching centers connecting over 300 computers in 180 cities. The Telenet system is utilized by "The Source" system (see below).

There are reports that GTE may initiate nationwide service targeted to business users via Telenet as early as late 1980. The company has also announced plans to establish satellite earth terminals in over 80 locations in the next two years to expand its intercity data network.

Viewtron (Viewdata) In April 1979, Knight-Ridder Newspapers announced it would conduct a pilot test in the Miami, Florida area to assess consumer interest in a viewdata system. Very little information about the nature and scope of the experiment and the technical characteristics of the system has been made public.

The $1.3 million experiment will be conducted by Viewdata Corp. of America, a Knight-Ridder subsidiary, over a 6-month

period beginning April 1, 1980. VCA plans to rotate 50 decoder-equipped TV sets among 150 to 200 homes in Coral Gables. Families will be able to access a computer in the firm's Miami headquarters via telephone. Knight-Ridder is designing the software for the system. AT&T is participating in the test and has provided terminals which, according to several reports, are a much improved version of the British hardware

The system will contain approximately 10,000 pages of information including local, national, and international news, weather and sports information, calendars of local information, listings of adult education courses, product ratings, local movie, restaurant and theater schedules, and boating and fishing information. There will also be emphasis on such transaction services as electronic banking and home shopping. The experiment will also test advertising applications of videotext.

Knight-Ridder has studied viewdata and teletext systems for several years and is currently participating in Prestel as an information provider.

U.S. Department of Agriculture "Green Thumb" Project (Viewdata) In early 1980, USDA began a two-year experimental viewdata project whereby farmers in Kentucky are able to receive weather and crop reports via a telephone-based home information system. Initially, 200 farmers in two counties received home terminals (manufactured by Motorola). The information requested will be stored in the Green Thumb Box, permitting the farmer to page through it at his own pace, thus reducing time on-line.

Also involved in the project are the National Weather Service and the University of Kentucky.

"The Source" (Viewdata) In June 1979, Telecomputing Corp. of America, a subsidiary of Digital Broadcasting Corp., initiated a hybrid viewdata service known as "The Source." In some respects "The Source" is not a true videotext service, but rather a personal computing and time-sharing system. Subscribers purchase (or provide their own) home terminal equipment consisting of keyboard, a 300 WPM telephone coupler and a 12-inch video monitor for approximately $630. More sophisticated equipment—including a hard copy page printer—is also available at significantly higher costs. Computer terminals, rather than television sets, are used as the display device. With this equipment, subscribers can access the TCA computer which contains a variety of databases. The information ranges from the *New York Times* news summary to educational, financial, shopping, and weather services. The service can

also be used for electronic mail, to both store and forward hard copy mail, and for on-line "chatting" with other "Source" subscribers. Information is transmitted via the Telenet packet switching network. The service has experienced some difficulty with the overloading of data carrier lines. Use costs for "The Source" are quite low, ranging from $2.75 per hour in nonprimetime (6:00 P.M. to 6:00 A.M.) to $15.00 per hour in prime business time. As of January 1980, "The Source" had approximately 3000 subscribers.

Infocast (*Teletext/Hybrid*) In 1979, Digital Broadcasting Corp. launched Infocast, a teletext service for specialized users that relays information via a combination of FM radio subcarriers and packet switching networks. The service is a form of electronic mail that allows businesses, associations, and other organizations to relay information to customers, members, or regional offices quickly and at relatively low cost. It is essentially a private or closed user teletext service.

Customers rent receiver terminals and printers for each office or location intended to receive the information. The receiving locations could all be in or around a particular city (and thus able to receive the FM signal locally), dispersed across a region or even the country. Messages and mail are then typed into a terminal with a set of codes identifying who is to receive the message. The receiver blocks all signals except those specifically addressed to it. High volume data for national distribution is routed through a Digital Broadcasting main office computer and then relayed via packet networks. It then is distributed locally via FM signal. National distribution of a 300-word message could be accomplished in as little as 60 seconds.

The infocast service is now available in Washington, D.C., Dallas, and San Francisco.

Cabletext™ (*Teletext Hybrid*) Southern Satellite Systems announced plans to begin a satellite-delivered teletext service for cable television systems in 1980, which it has registered under the trade name "Cabletext."

Although Southern Satellite has not made final plans, initially it intends to piggyback alphanumeric news services on unused lines of the WTBS superstation signal that Southern distributes as a resale carrier. Southern Satellite—not WTBS—will insert the teletext data in the WTBS signal at Southern's uplink facility. Thus, the firm will presumably not have to meet FCC broadcast transmission standards. The Cabletext™ service could be a discrete full (or partial) channel service to cable operators or, if cable subscribers were

equipped with decoders, the service could flow through the system to subscribers just as in a broadcast teletext service. At least initially, the former approach seems most likely, and in this sense, the service is merely a more efficient way of delivering alphanumeric services to cable systems. Southern Satellite is negotiating with the major wire services and is also attempting to develop its own software for Cabletext. The company expects to provide about 200–400 pages of information. It recently contracted with Scientific-Atlanta, a manufacturer, for 100 decoders.

In addition to the aforementioned experimental and operating videotext systems, many other commercial and noncommercial organizations are investigating or planning videotext ventures. Both RCA Corp. and AT&T have conducted small scale videotext trials. WRC-TV, Washington, D.C., KTTV-TV, Los Angeles, and WGBH-TV, Boston have investigated teletext opportunities as have group broadcaster Metromedia and publisher/broadcaster Harte-Hanks Communications, Inc.

Oak Communications Inc., which is developing a teletext decoder, has plans for a teletext experiment. Micro TV Inc., an MDS operator, has been marketing its Infotext system for several years.

Other hybrid videotext systems include the Reuters "Monitor" Information Retrieval Service, now operating in New York, and a TOCOM-Dow Jones planned information retrieval service.

Videotext Issues

From a U.S. perspective several broad sets of questions will need to be explored more fully, if not resolved, prior to any large-scale domestic videotext development. The complexity of these issues, many of which are interrelated, makes the future of domestic videotext highly unpredictable. These broad areas generally involve (1) conceptual/definitional issues; (2) economics and marketing; (3) technology and standards; and (4) law and regulation.

Briefly, the definitional issues involve such questions as what is or should be the nature of videotext (and the various forms of videotext)? What kind of medium is it? Who needs it, who should provide it, and how should it be structured in the United States? Closely related are a range of economic and marketing questions. Is there a market or distinct markets for such service? How should it be offered? Under what terms? Can it be profitable? The technical and standards issues include questions concerning technical configura-

tions, standardization across technologies, international and domestic standrads and the role of government in establishing them. Equally complex are legal questions involving ownership, structure, content, and regulatory responsibilities.

The fifth issue—tied closely to the manner in which the others are resolved—concerns public broadcasting's role in videotext.

Conceptual Issues

Despite the fact that videotext is already operating in a few countries, debate over a broad range of conceptual and definitional considerations continues. Is videotext a totally new medium? Is it a mass medium, an individual or specialized medium (or both), or something in between? Is it more akin to publishing or broadcasting, or does it merely represent a broadening of computer and data processing businesses? Is it by nature more a national medium or a local one? What services and informational retrieval functions are appropriate to videotext? How do or will users, particularly the consumer accustomed to satisfying information needs through a variety of traditional media, perceive videotext?

In part, the answers to these questions depend on the type of videotext contemplated. Since videotext utilizes existing distribution systems, the characteristics of those systems affect the nature of videotext.

The Japanese and others have argued that videotext is by nature a mass individual medium, somewhat akin to telephone service. The economics of videotext are based upon large numbers of subscribers regularly accessing relatively small amounts of information. It is hard to imagine most forms of videotext succeeding without penetrating the mass market, although viewdata services aimed primarily at businesses may be viable.

Most types of videotext can be seen as either national, local, or both. One-way systems such as wideband teletext seem particularly well suited to national operation (with or without local insertion capability), primarily for economic reasons. With interactive systems such as viewdata, the cost of operations is greater but the opportunity for cost recovery is also greater. In telephone-based systems, there appear to be sound reasons for confining the service to the local loop area. In Prestel, for example, while the British Post Office envisions a nationwide service, it plans to replicate the Prestel database in different computers around the country, thus permitting

the subscriber to access the system with a local call. However, this approach also increases costs for information providers, and is of concern to IPs who do not see their product as "national" in scope.

Equally significant in defining the nature of videotext are characteristics associated with large-scale computing. Among these characteristics are speed (virtually instantaneous retrieval of information); choice (what you want, when you want it); recall-capability (the ability to return for information); and update capacity (the capability to continuously update information).

Some observers make fundamental distinctions between the likely uses of teletext as opposed to viewdata systems. For example, teletext information is often compared to newspaper, while viewdata is compared to a magazine or a book. Teletext information, it is argued, is more perishable and has broader appeal; viewdata information is more enduring and has narrower appeal. Another common observation is that the teletext database is organized like a menu, while the viewdata database is far more complex and usually organized in a hierarchical tree structure.

Economics and Marketing of Videotext

It is difficult to draw many solid conclusions about the economics and marketing of videotext. Operating experience is limited and developers are reluctant to generalize from small-scale trials. In addition, teletext services are provided free by broadcast organizations not now, at least, concerned with making the services self-sustaining. Nevertheless, some information is available and does provide some insight into these questions.

Among several factors affecting the economics of videotext are that: (1) videotext has mass market potential, and doesn't require large capital outlays for distribution plant because it utilizes existing communications links to the home or office; (2) it benefits by the declining costs of electronics components; (3) scale economies can apply because of its mass market potential; (4) a significant number of databases is already available or easily adapted for the home market because of the explosive growth of the computer industry and the involvement of many information firms in that growth.

Despite those factors, videotext is faced with the classic chicken-and-egg problem common to many developing industries. Services won't develop without the technology, yet the cost of technology will remain high until sufficient demand is demonstrated.

Videotext also faces competition from specialized information retrieval firms already serving business and professional needs, the market it would use as a bridge to the home market.

Relatively low capital costs make entry into the teletext business attractive. To equip a broadcast station for teletext operation, all that is necessary is a micro-computer at costs ranging from $15,000 to $100,000, depending upon the capability desired;[6] a signal generator/inserter costing about $3,500 and miscellaneous equipment ranging from $5,000 to $10,000. It is possible to offer a basic teletext service for an initial capital outlay of about $100,000. The major operating cost is personnel to constantly update the database.

The cost of individual teletext decoders remains high, largely because an insufficient market exists to achieve scale economies. The first generation Telidon terminal costs from $2,000 to $3,000. A second generation terminal available in 1981 and able to access both teletext and viewdata will cost about $1200. The Canadians ultimately expect the cost to drop as low as $300. The Antiope decoder now costs $2500 to produce. However, this will also drop substantially in 1981 as Antiope production moves into very large scale integrated circuits. The Ceefax/Oracle terminals now cost in the range of $400, but are expected to drop as low as $100 by the mid-80s.[7]

The second major question about teletext is how the service would be supported. The capital and operating costs appear low enough so that it might be offered free, subsidized by the broadcaster. However, it is more likely that over time operators would attempt to generate teletext revenue. In closed user services, such as the Antiope-Bourse service in Paris, revenues might be obtained by the leasing of decoders or through monthly or annual fees for the service. For services to the general public, the obvious revenue vehicle is advertising. The British ITV companies have a strong interest in teletext advertising and at least one U.S. broadcaster has experimented with ads. Advertising space might be sold by full page or on other information pages. However, substantial research and experimentation will be necessary before advertising establishes itself on teletext. For instance, commercial broadcasters interested in teletext

[6]More sophisticated computers are, however, probably the norm. Ceefax operates with three computers, the newest costing about $250,000. Also, additional terminals to allow multiple access to the computer by information providers would increase costs by $12,000 to $15,000 per unit.

[7]By comparison, the much less sophisticated closed captioning terminal is now being sold by Sears for $249.

will need to confront the question whether teletext ad revenues would offset possible loss of revenues through regular advertising.

Important operating economies of scale might also be realized if, as in England, teletext is developed as a national medium by a network (with the capability for local insertions). One centralized database of "national" information assembled and updated at the network and available to many local outlets might well be more efficient than many local operations. Those same economies would apply in the case of a cable teletext service.

The economics of viewdata are more complex, although there are similarities to teletext. Terminal costs are generally comparable—the Antiope and Telidon terminals are interchangeable between the two services, for example—although more expensive and sophisticated terminals appear likely.[8]

Given the scale of viewdata operations, however, far more sophisticated computers are necessary as well as much more complicated database assembly, editing, and update. One indication of viewdata costs is represented by the British Post Office's reported commitment of over $50 million to develop Prestel. Costs to users and information providers of Prestel were described earlier. It has been reported that Prestel's fees to users and information providers were established at a level to attain break-even at about 200,000 users. A common information provider assumption is that the average Prestel viewer will spend about $120 annually on service (excluding telephone charges).

The marketing questions associated with videotext development are closely tied to structure—whether videotext will be operated as a private service by broadcasters or publishers, a common carrier service offered by telephone utilities, or in other ways. Marketing also relates to manufacturers' attitudes toward the extent of the videotext market, as the British experience demonstrates. Further questions depend on how the service is configured and whether it develops as a local, regional or national offering.

Some observers are critical of the marketing of Prestel to date. Each entity involved in Prestel—the post office, information providers, manufacturers and rental companies—has marketing objectives which, while broadly compatible, may vary. It is argued that these varying objectives have not always resulted in the most efficient approach to establishing the Prestel service.

[8]Terminal costs also increase if terminals are "smart," that is, able to store and process information.

One key marketing question relates strongly to the conceptual issues discussed earlier. What is Prestel's concept of the service it is marketing, and what is the user's perception of the service? Is it a reference service, an entertainment medium, a personal business service, or amalgam of these services?

As we have noted, little information exists on the marketing issues, although several market studies, particularly in Canada, suggest a potentially strong interest by consumers in videotext. The BPO plans a major promotion of Prestel this year that may help answer these questions. In the U.S., Quantum Science Corp., a research firm, has suggested that viewdata revenues might exceed $100 million in 1985. Arthur D. Little, however, has predicted that as many as 8 million homes could receive viewdata by the early 1990s and that teletext could be available to many more homes. Even assuming relatively low per-subscriber revenue levels, Arthur D. Little's projections could translate to overall revenues as high as half a billion dollars or more. The widely varying estimates underscore the hazards of predicting the videotext market in this country.

Technical and Standards Issues

Videotext in its early stages has been driven by technology. Various commercial firms and governments, in Britain, France, Canada, Japan, and elsewhere, have developed videotext hardware systems with differing technical characteristics. This resulted in a range of operating capabilities as well as hardware costs.

Technical and standards issues are important to U.S. videotext development for several reasons. The technical characteristics of systems introduced in the U.S. will influence the rate of development of videotext. The natural tendency is to engineer systems able to do all that the technology will allow. However, at this point, marketing and economics intrude. If the technology is too expensive and sophisticated, can the market be developed? The British, for example, consciously chose to sacrifice certain technical capabilities for the sake of simplicity and cost. One view is that, from a technical perspective, videotext should be developed in a modular fashion, beginning with relatively simple and lower cost terminals. It is argued that this will help establish a market, familiarize the public with information retrieval, and help reduce the cost of components. Later, more sophisticated capabilities can be added. The problem is that competition among manufacturers and videotext developers may not permit this.

Closely related is the question of standards and compatability of systems. There are cogent reasons why standardization of most aspects of videotext systems is important. Compatability will permit systems to interconnect both nationally and internationally, thus facilitating information flow. Compatability will permit a variety of terminal devices to be used with different systems. Both developments would help create scale economies for manufacturers, a wider market for equipment, and ultimately lower costs to consumers. The areas of incompatability among most current systems involve the language or alphabet character set, signal transmission and coding schemes, and page display format (the number of rows per page and characters per row).

When and how these and other standardization problems will be resolved is unclear. A subcommittee of the Electronics Industries Association will present recommendations on teletext standards to the FCC in mid-1980. Standards could be established either through FCC action or industry agreement. At the same time several international organizations, including the International Standards Organization and committees of the International Telecommunications Union (ITU) are at work on international standards.

Given the uncertainty—and yet the potential—of the videotext market and the fact that some entities are already operating and marketing videotext systems, it is not at all clear that standardization will be achieved soon.

Legal/Regulatory Issues

While it is possible to draw tentative conclusions for the United States from foreign experience with technical, marketing, and economic issues associated with videotext development, the legal and regulatory issues offer considerbly more uncertainty. Most foreign systems, of course, are developing under governmental auspices and consequently resolution of these issues perhaps has been easier. In the U.S. the likely or even proper role of regulation in videotext development remains cloudy. Revisions to the Communications Act, which could directly or indirectly affect videotext, are possible. Still unresolved regulatory issues in the common carrier field—particularly concerning the distinction between communications and data processing—are another source of uncertainty. Added to these factors is the complexity created by the different types of videotext—including hybrid services—and the manner in which they should be regulated, if indeed any regulation is necessary.

To date, the only FCC involvement in videotext has come through issuance of special temporary authorizations for teletext operations. However, both the FCC and NTIA have monitored foreign and U.S. videotext developments and, assuming that the initiation of some type of commercial videotext service may not be far off, substantive regulatory proceedings on videotext may begin soon.[9]

It seems clear that at least some FCC regulatory action on teletext will be necessary. Since teletext is a broadcast service likely to be transmitted on the television vertical blanking interval, the Commission must determine which lines may be used and presumably prescribe standards ensuring noninterference. (The FCC has authorized experiments on lines 13, 14, 15, 16, 17, and 18; line 21 of the VBI has been authorized for regular use with the closed captioning system developed by PBS and HEW.) The number of presently unused or underutilized television lines which are authorized for teletext will have an important effect on the kinds of teletext service possible and the amount of information able to be transmitted.

More complex is the question of licensing. Must or should a teletext service be licensed, to whom should or can it be licensed, and if so, what licensing criteria are appropriate? Could there be as many teletext services in a market as there are stations? Although it is logical to assume the broadcast licensee would operate a teletext service on his assigned frequency, that is only one possibility. The broadcaster could contract with or permit a second party to provide the service, as is the case with FM SCA services, and subscription television. Are cross-ownership issues relevant in teletext? Could the FCC license a full channel for teletext operation?

Even more important are content questions. Does the FCC have statutory authority to regulate the content of a teletext service and, if it does, should the Commission exercise it and how? In the case of noncommercial broadcasting, how should the Commission deal with the question of commercial sponsorship or underwriting?

The regulatory questions in the viewdata area may be even more complex. Should viewdata systems be regulated at all? Is the common carrier model appropriate? Should viewdata be treated as

[9]In January 1980, the FCC proposed amending its TV transmitter operating rules to permit broadcasting of visual information when a station would otherwise be off-the-air. These visual information services—news crawls, for example—are functionally similar to teletext. *Notice of Proposed Rulemaking*, BC Docket No. 79-80-10, January 23, 1980.

electronic publishing and operators be afforded the same First Amendment status as any other publisher?

Much current thinking tends in the direction of treating viewdata as a common carrier. The British Post Office has operated Prestel as a common carrier without major problems. However, some contend that this approach has made it difficult to market the service in a coherent fashion and has resulted in many duplicative databases (In some cases, essentially the same information is offered by government agencies, private firms, and consumer groups). The common carrier model in Great Britain has also indirectly stimulated the creation of an information provider association, which is attempting to develop self-regulatory codes in such areas as advertising, ethics, and standards of taste. Legal questions concerning obscenity, libel, and fraud on viewdata are highly complex.

U.S. regulation will also have to deal with such questions as AT&T's possible role in viewdata in light of the 1956 Consent Decree[10], the U.S. Postal Service's role in electronic mail, and regulatory jurisdiction questions involving banking regulation, trade and advertising regulation, state public utility commissions, and perhaps even cities. A substantial number of privacy issues also deserve attention.

In short, the number and complexity of regulatory issues in videotext—coupled with the potentially major economic interests at stake—suggests that the manner in which the government deals with these matters may be of crucial importance to when and how videotext begins operating in the United States.

Public Television and Videotext

In recent months the national public broadcasting organizations and several stations have become interested in public television involvement in videotext and are assessing their possible videotext roles. However, today no system-wide consensus exists on the appropriateness of public television involvement in videotext or the nature of that involvement.

WETA-TV in Washington, D.C. and KCET-TV, Los Angeles, have already conducted or plan to conduct limited tests with teletext. Several planning studies have also addressed the public televi-

[10]1956 Trade Cas. par. 68,246. Basically, the decree prohibits AT&T from offering any interstate service unless it is a regulated common carrier offering.

sion/videotext question. For example, the recent PBS System Planning Project[11] noted,

> The development of "teletext" or "Prestel" type data transmission systems using television signals received over the air, via cable, or by telephone line, represents one of the most significant potentials for education in the home since the development of the television receiver. . . . Public television must act, through the development of working demonstrations, to ensure that strictly commercial interests do not come to dominate the development of this potentially powerful information system. Efforts in this area currently underway should continue.

A recent report by the Aspen Institute Program on Communications and Society[12] discussed a variety of issues relevant to the future of videotext in the United States. Although the report was primarily concerned with the commercial development of videotext services and governmental policies, it noted, "Public television, so long as it remains a non-commercial service, offers the best potential for integrating broadcast and teletext service."

The report suggested that public television stations could benefit from offering a teletext service. "Textual and graphic information might supplement instructional, cultural, and bi-lingual programming, and thus provide enhanced service to the public television viewer. At the same time, this enhanced service might be a feature to attract new viewers and contributors to public stations," Aspen noted.

A study commissioned by the Corporation for Public Broadcasting deals directly with public broadcasting and videotext. The study, which describes a number of strategies for public broadcasting involvement and makes several recommendations, is expected to be available in the spring of 1980.[13]

Several questions must be addressed in assessing a public television role in videotext. First, why should public television become involved in videotext? Several reasons are possible. In the future

[11]*General Recommendations*, System Planning Project, Public Broadcasting Service, June 20, 1979, Project Paper #11, p. 20–21.

[12]Joseph Grundfest and Stuart N. Brotman, edited by Michael Rice, *Teletext and Viewdata: The Issues of Policy, Service and Technology*. Report of an Aspen Institute Workshop, August 12–15, 1979, (released December 3, 1979) p. 41.

[13]Fred Cohen and Richard Hooper, *Public Broadcasting, Videotext, and Teletext: The Present and Future*, spring 1980. Another report scheduled for spring release is *Teletext and Public Broadcasting: A Report to CPB and NTIA*, Alternate Media Center, New York University, April 1980.

teletext may become an integral part or regular broadcast service to the public. If so, then teletext would become merely an added dimension. Closely related is the question whether there ought to be a purely noncommercial teletext service. There may well be justification for a teletext service without advertising (or fees to users) and one which provided desirable information which a commercial service might not attract or support. Both of these rationales for teletext could be valid, but it appears premature to make any such judgments based upon present experience.

Another reason is that the service provides opportunities uniquely relevant to public television and its mission. Teletext could enhance cultural, educational, or public affairs program offerings by providing in-depth or supplemental information related to a program. There is growing interest in such services in England, particularly on the BBC service. Or teletext may provide the opportunity to develop new information services, particularly in the educational field, or stimulate production of programs specifically designed to be used in conjunction with teletext.

Another rationale for public television interest in teletext is the possibility of new revenue. Clearly, some governmental officials and many in the system itself are interested in developing methods for public broadcasting to become more self-sufficient while preserving its essentially noncommercial nature. Revenue opportunities may develop for public television as an information provider, teletext operator, or both. Teletext could also be justified on the grounds that in the far more competitive communications environment of the 1980s public television must, within the framework of its overall purpose in society, move aggressively to capitalize on service opportunities that preserve and increase its value.

A second crucial issue concerns the appropriate strategy and timing for developing a public television videotext role. Public television could make an early and sizable commitment to a teletext operation, or it could choose to wait until most of the unanswered questions about videotext are resolved.

Just as important are a variety of issues concerning the nature of public television's involvement. Should public television commit only to teletext operation or should it consider involvement in viewdata or hybrid systems? Should it look upon itself as an operator of teletext systems? Should a public television operation be seen as national in scope—a PBS service—or should stations move independently into teletext? Should it be a national service with a regional

or local component? Whatever the involvement, should it be undertaken in a noncommercial manner or commercially through profit-making subsidiaries?

Possible Roles

Perhaps the most attractive option is creation of a national PBS teletext service to be distributed to stations via satellite. In turn, the stations would broadcast the service (or distribute it through nonbroadcast means) locally with or without local insertions. This approach would make possible scale economies in the assembly and maintenance of the database and would take advantage of PBS's well-developed satellite distribution capability that to some extent is underutilized. Since PBS stations now serve about 90 percent of the population, this option could make a teletext service available to many persons who, depending upon the commercial networks' role in teletext, might not otherwise receive the service. A PBS teletext service could provide important support to PBS national programming through program listings and promotion as well as through the provision of supplementary material to accompany national programs. It is also possible that such a national service might ultimately create revenue opportunities.

This approach to teletext may raise the traditional issues of "centralization" and competition with the commercial sector. A more significant factor, however, is that a national service would involve relatively high start-up costs in public broadcasting terms and significant operating costs without any identifiable means of support. At the same time, except as database information is directly related to public television programs and services, it remains unclear just what the needs and market for "national" information will be.

A second option is for stations to undertake teletext service on a local or statewide basis. Here the decision to initiate the service could be based on local circumstances and the information could be tailored to market needs. The disadvantages of this approach are that the start-up and operating costs would be a major undertaking for most television stations and, at least for smaller stations, the necessary expertise may not be present. It is possible that NTIA facilities grants could be used for teletext operations.

PBS or individual stations could attempt to provide information to commercial teletext operators. This option requires a much more limited investment, minimizes risk, and, again, creates a possi-

ble although limited source of revenue. With this approach, the station or PBS could limit its involvement to databases related to public television services, programs, and needs.

In addition to these three options, public television could consider teletext operations using the full TV channel bandwidth on second channels in a market. This option might be considered in view of the large number of vacant UHF noncommercial allocations, particularly if such service could be revenue producing.[14] (Clearly, regulatory problems would have to be resolved.) A related option, which the French are exploring, is use of the full bandwidth for teletext when regular programming is not being broadcast, or providing short bursts of full channel teletext at the end of a program.

Public television's use of viewdata systems seems to offer a narrow range of options, although in the case of hybrid systems potential roles not now apparent might evolve.

It is hard to see a public television viewdata role in anything other than the software area. Yet, depending on how viewdata systems are structured, a role as information provider may well create revenue opportunities while limiting costs to those associated with database assembly and maintenance. Still, operating costs would be significant and the public television information would only be one of hundreds of databases.

Without doubt it is too early to answer fully the many regulatory and marketing questions U.S. videotext development raises. This situation probably will not change dramatically anytime soon, and argues strongly against any major early commitment by public television, especially in a time of limited resources. The important issues associated with videotext may not be fully resolved until well into the eighties.

It is likely that a variety of videotext systems will be tried in this country over the next 5 to 10 years. By the end of the decade some type of home information system able to access external sources should be generally available and making inroads on the home market. The structure and configuration of these systems may well change considerably from what we now see in developmental stages. It also seems safe to assume that a mixed videotext system will develop in the U.S.—teletext, viewdata, and hybrid systems at

[14]A preliminary report by the FCC's UHF Comparability Task Force (Gen Docket No. 78-391) noted that as of late 1978, 375 or 66 percent of UHF channels allocated to noncommercial use were vacant. Fifty-nine of the 100 largest television markets have vacant noncommercial UHF channels.

least initially developing side by side. Over time, a sorting out and consolidation will probably take place.

In the short term, however, there is ample justification for a modest level of public television involvement in videotext, including several teletext experiments. In particular, these experiments should attempt to explore aspects of videotext most relevant to public broadcasting's unique mission in America. Specifically, how can public television use videotext to extend and enhance the objectives and values of public broadcasting? The educational applications of videotext appear to us to be particularly important.

We suspect it will be useful to compare commercial teletext operations with noncommercial services. It may be that both can and should exist, each serving different needs. Experience with the BBC and ITV services suggests this possibility.

Videotext-based information directed both to the general public and for institutional purposes can be an important aspect of public broadcasting's evolution toward a broader public telecommunications role in society.

APPENDIX A

Financial Projections for PACE

Our assessment of the feasibility of the proposed PACE pay cable network is based upon financial projections prepared with the assistance of Mr. Robin Carpenter of Management Analysis Center, Inc. of Cambridge, Massachusetts. The base case set forth in the body of this report is one that we believe reflects a reasonable set of assumptions.

A full presentation of the financial data projected for the base case is presented here as *CASE A*. In addition, the basic model was run in 12 different ways to determine how different assumptions affect the results. Summaries of these models are presented as *CASE B* through *CASE M*, immediately following the full presentation of the base case.

The following discussion is designed to explain the basic assumptions that were built into the various cases we are presenting. All costs and projections are in 1980 dollars; no inflation rate has been assumed.

Industry Projection

The predicate of the financial model is a set of assumptions about the present size and structure of the cable television industry, and the rate at which it will grow in the foreseeable future. The most reliable estimates we found were those prepared by Paul Kagan Associates (PKA). The PKA 10-year industry projections (1980-1989) that underlie our model are set forth in Table A-1.

Anticipated Subscribership

The most important variable in calculating the feasibility of any new cable service is the number of subscribers likely to buy the service. That variable, known in the industry as the "penetration," is itself

Table A-1 Cable TV Industry 10-Year Projections

At Year End	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
New miles constructed	50,000	50,000	50,000	50,000	50,000	40,000	35,000	30,000	25,000	20,000
New homes passed (mil.)	5.0	5.0	5.0	5.0	5.0	4.0	3.5	3.0	2.5	2.0
New basic subs @ 40% HP	2.0	2.0	2.0	2.0	2.0	1.6	1.4	1.2	1.0	0.8
Cumulative basic subs at year-end from new builds (mil.)	2.0	4.0	6.0	8.0	10.0	11.6	13.0	14.2	15.2	16.0
Cumulative basic subs at year-end, from old base @ 7% annual growth, compounded from 16 million subs @ year-end 1979	17.1	18.3	19.6	21.0	22.4	24.0	25.7	27.5	29.4	31.5
Total year-end basic subs both new and old (mil.)	19.1	22.3	25.6	29.0	32.4	35.6	38.7	41.7	44.6	47.5

Net increase in year-end subs (mil.)	3.1	3.2	3.3	3.4	3.4	3.2	3.1	3.0	2.9	2.9
Total year-end new homes passed (mil.)	5.0	10.0	15.0	20.0	25.0	29.0	32.5	35.5	38.0	40.0
Total old base homes passed @ 1.5% growth (mil.)	35.0	35.5	36.2	36.7	37.3	37.9	38.4	39.0	39.6	40.2
Total homes passed (mil.)	40.0	45.5	51.2	56.7	62.3	66.9	70.9	74.5	77.6	80.2
Pay subs @ 80% of new subs	1.6	3.2	4.8	6.4	8.0	9.3	10.4	11.4	12.2	12.8
Pay subs @ 40% of old subs	6.8	7.3	7.8	8.4	9.0	9.6	10.3	11.0	11.8	12.6
Total pay subs (mil.)	8.4	10.5	12.6	14.8	17.0	18.9	20.7	22.4	24.0	25.4
Basic revenue @ $100/yr/sub (billions of $)	$1.9	2.2	2.6	2.9	3.2	3.6	3.9	4.2	4.5	4.8
Pay-cable revenue @ $120/yr/sub (billions of $)	$1.0	1.3	1.5	1.8	2.0	2.3	2.5	2.7	2.9	3.0
Total basic + pay revenue	$2.9	3.5	4.1	4.7	5.2	5.9	6.4	6.9	7.4	7.8

Source: *Cablecast*, Paul Kagan Associates, Inc., Nov. 16, 1979.

dependent upon two factors. First is the number of homes accessible to such a service. Second is the percentage of those accessible homes that choose to subscribe.

The Universe The first question is how many cable television subscribers would be *able* to subscribe to the service. While it is conceivable that low capacity cable systems, those with 12 or fewer channels, could offer the PACE service, we believe few would because of its relatively low anticipated penetration. A cable operator with a scarcity of channels is unlikely to assign one of them to a service expected to serve about 5 or 10 percent of his basic subscribers. The relevant universe is therefore considered to include only subscribers in systems providing a converter or its equivalent—a set-top device that expands channel capacity.[1] We also assumed that all new subscribers added after January 1, 1980 would have converters.[2] (This in turn assumes that cable industry growth occurs

[1]Over the next several years some manufacturers may offer television sets with a built-in equivalent of a converter. Subscribers with such sets would, of course, be in the universe for the service we propose.

[2]Because our projections assume that operations cannot begin until 1982, we show below how the industry projections which we use have been built up during the 1979–1982 period.

Table A-2 Cable Industry Projections Prior to PACE Launch Date (in millions)

	1979	1980	1981
New Homes Passed		5.000	5.000
New Basic Subs		2.000	2.000
Cum. Basic Subs—New		2.000	4.000
Cum. Basic Subs—Old	16.000	17.120	18.318
Total Basic Subs	16.000	19.120	22.318
Net Incr. in Subs		3.120	3.198
Tot. New Homes Passed		5.000	10.000
Tot. Old Base Passed	34.480	34.997	35.522
Tot. Homes Passed	34.480	39.997	45.522
Pay Subs of New Subs		1.600	1.600
Pay Subs of Old Subs	6.400	6.848	7.327
Tot. Pay Subs	6.400	8.448	8.927
Basic Revenue		1912.000	2231.840
Pay-Cable Revenue		1013.760	1071.283
Tot. Basic & Pay Revenue		2925.760	3303.123
Cum. Basic Subs—Old	16.000	17.120	18.318
Less: Nonconv.	11.375	10.431	9.565
Old Sub Universe	4.625	6.689	8.753
Cum. Basic Subs—New		2.000	4.000
Eligible PACE Universe	4.625	8.689	12.753
Net Incr. in Universe		2.064	4.064

mostly in newer, higher-capacity systems; that older, low-capacity systems are saturated and will experience little growth; and that all new systems are being built with converters.)

A key number to be determined is how many subscribers currently have no converter, since they are presumed to be inaccessible. Although there is no industry information with which to divine this number precisely, we have estimated the number of cable subscribers without converters at 11,375,000 as of January 1, 1980. The reasoning is as follows:

1. The number of converters estimated[3] to be in place is five million.
2. From that we subtracted an estimated 375,000 STV subscribers,[4] all of whom require converters to receive STV service.
3. This leaves 4,625,000 converters in cable systems. This number represents the relevant universe as of January 1, 1980: the number of cable subscribers with the technical capability to receive the proposed service.

Subtracting 4,625,000 subscribers with converters from the 16,000,000 total cable subscribers, we estimate, then, that as of January 1, 1980, there were 11,375,000 subscribers with no converter. These are largely subscribers to older, low-capacity systems. Some older systems are in the process of being rebuilt, and as this happens system operators add higher capacity amplifiers and converters. There is no reliable way to determine how quickly such rebuilding will take place, but HBO, Showtime and other direct subscriber-supported services have given cable operators the incentive to undertake this investment in upgrading their plant. Our assumption is that the number of subscribers without converters will be halved in eight years. Table A-3 illustrates what these calculations show in the first several years.

Penetration Rate Penetration rate is the most important variable that can be tested by the model. Almost as important is the speed with which that rate is reached.

The penetration rate is a percentage of the universe of cable subscribers capable of receiving the service. While HBO and Showtime attempt to reach all cable subscribers through their broadly appealing program fare, that is not our expectation for PACE. We are proposing a service of distinctly limited appeal. The base case

[3]This estimate is said to be plus or minus 10 percent, and was made by John Gwin, President of Oak Communications, Inc., the largest manufacturer of converters.
[4]Donaldson, Lufkin & Jenrette, *supra*, p. 28.

Table A-3 (in millions)			
	1981	1982	1983
Cum. Basic Subs—Old	18.318	19.600	20.972
Less: Nonconv.	9.565	8.771	8.043
Old Sub Universe	8.753	10.829	12.929
Cum. Basic Subs—New	4.000	6.000	8.000
Universe	12.753	16.829	20.929
Net Incr. in Universe	—	4.100	4.136

assumes an ultimate penetration of 5 percent. We have also tested other penetration rates from 3 to 10 percent.

No matter what the ultimate penetration rate, it will not be possible to attain it immediately upon initiation of the service. The speed with which the service approaches ultimate penetration is therefore also important. This variable—the rate of approach—is used to take into account not only the time it will take to sell the service to subscribers of a participating system, but the selling of MSO's and participating systems as well. The model calculates the rate of approach to full penetration based upon the estimated number of years required to reach one-half of the ultimate penetration rate. We refer to this variable as the number of years to half life. The remaining potential penetration is halved again over the same number of years.

For example, the base case assumes a 5 percent penetration potential with three years required to reach half of it. In other words, 2.5 percent (half of the 5 percent penetration rate) of the universe would subscribe by the end of year three; half of the remaining 2.5 percent will subscribe in the next three years; half of the 1.25 percent still remaining will subscribe in the three years after that, and so on. The model continues to build up to (but never quite reaches) the 5 percent penetration rate.

A penetration rate of 5 percent is a more complex assumption than it might seem. Bear in mind that it projects 5 percent of the entire universe. Within that universe there undoubtedly will be some cable systems not offering the service. There will be others that offer it but do not promote it well. There will be some areas of the country where interest in such a service is low. Thus, a 5 percent rate takes into account those conditions plus a higher penetration rate in

systems where the service is offered and sold well. There is no reliable way to forecast this phenomenon in the model, so one's expectations about effective penetration under optimal circumstances must be understood to be only one component of the overall penetration rate within the entire universe.

As mentioned, the base case (CASE A) assumes a 5 percent maximum penetration rate, half of which is captured in three years. Other combinations were tested and are set forth at the end of the *Appendix*. All of our combinations and their breakeven projections follow.

Table A-4 Breakeven Projections

CASE		BREAKEVEN YEAR*	CUM. DEFICIT BEFORE BREAKEVEN YEAR (in millions)	CUM. PAYBACK YEAR**
A	5%, 3 years to half	1985	$28.230	1987
B	4%, 2 years to half	1985	25.753	1987
C	4%, 3 years to half	1986	39.530	1989
D	4%, 4 years to half	1987	55.054	1993
E	5%, 2 years to half	1984	18.440	1986
F	5%, 4 years to half	1986	38.811	1989
G	6%, 2 years to half	1984	13.427	1985
H	6%, 3 years to half	1984	21.586	1986
I	6%, 4 years to half	1985	29.903	1987
J	7%, 2 years to half	1983	9.985	1984
K	7%, 3 years to half	1984	17.933	1985
L	7%, 4 years to half	1985	23.663	1986
M	10%, 5 years to half	1985	19.902	1985

*Defined as the year during which PACE first experiences an operating surplus. At this point, the cumulative deficits have reached their maximum.

**Defined as year in which cumulative surplus is positive, or cumulative operating deficit is eliminated.

Revenues and Expenses

Net Revenues This analysis assumes a net revenue per subscriber of $4.50 in all cases. We have assumed that PACE will be priced at $9.00 per month to the subscriber. Revenues are further assumed to be divided equally between the cable system and the PACE network. While pay cable rates vary and other calculations (like bulk discounts) affect the split, the industry's experience is not

too far from a 50-50 split. Thus, for convenience, that approach was built into the model.

Costs—Nonprogramming Aside from the cost of program production and acquisition, we project costs in five other categories: (1) executive staff; (2) technical operations and overhead; (3) satellite distribution; (4) sales and marketing; and (5) interest expense. At this stage of financial projection, it is difficult to arrive at precise figures for operating costs without making a number of arbitrary decisions. We have done so, in the fashion outlined below. It should be noted that such items as staff and technical operating expenses have relatively minor impact on the outcome of any of the models. Particularly in comparison with the primary cost of the service—programming—these nonprogramming costs do not significantly affect the financial statement.

1. *Executive Staff* In the first year of operation the model assumes executive staff costs as follows:

General Management	$250,000
Financial Department	250,000
Programming Department	250,000
Total	$750,000

These costs are assumed to increase by 30 percent each year through the fifth year of operation (1987), at which point they are assumed to stabilize.

2. *Technical Operations* The model assumes technical operations costs to grow as follows:

1982	$ 300,000
1983	500,000
1984	800,000
1985	900,000
1986	900,000
1987	950,000
1988	1,000,000
1989	1,000,000
1990	1,000,000
1991	1,000,000

Initial capital expenditures of $1 million will be required to equip a technical operations center prior to a 1982 launch. Replacements

and additions to capital plant are assumed to be added in the future years as follows:

1982	$1,000,000
1983	1,000,000
1984	500,000
1985	250,000
1986	—0—
1987	250,000
1988	—0—
1989	250,000
1990	—0—
1991	250,000

These expenditures are capitalized, with an assumed useful life of ten years. Each year's depreciation is calculated at one-tenth of the remaining (undepreciated) balance.

3. *Satellite Distribution* Distribution costs per year primarily consist of the leasing of a minimum of two satellite transponders (one for east coast, one for west). Annual lease payments are estimated at $1.5 million each, for a total of $3 million. Far more critical than the actual cost of transponder leasing is the availability and the terms for utilization of the cable/satellite interconnection. With the loss of RCA's most recent satellite, transponder allocation has been limited. Recent announcements indicate that RCA will be provided with space on the AT&T/COMSAT system, Comstar, indicating that many cable systems will buy a second receiving dish to "look at" that satellite, which will offer new services they wish to utilize.

Were Westar to attract significant services, PACE might realize considerable cost savings. PBS currently operates one of the most sophisticated satellite operation centers in the country, all focused upon Westar. If PACE could piggyback the existing system, it might well be cheaper and more readily available than the RCA Satcom system. (Even without such a development, operations costs might be able to be shared with existing PBS satellite operations in Washington, were authorization obtained for PACE to be uplinked to the RCA satellite from the ARTEC satellite facilities located in Northern Virginia. The ARTEC uplink, aimed at Satcom, is currently used by C-SPAN for its public affairs service, and is being sought as a gateway uplink to RCA's satellite by other services desiring to reach the cable market from Washington. In any event, these are not contingencies that can be relied upon for purposes of costing.)

4. *Sales and Marketing* The model assumes three categories in the sales/marketing area. They are the marketing manager and his/her staff, estimated to be $100,000 per year; the field sales force, estimated at five persons in 1982, growing to ten four years later (payroll cost assumed to be $40,000 and travel estimated at $300 per day for the three days out of five that salespersons can be expected to travel); and an advertising budget of $100,000 per year as a base plus $2.00 per subscriber per year.

5. *Interest Expense* Estimating a reasonable interest rate for the coming year is difficult; estimation for the next ten years is nearly impossible. We have calculated that debt will be available at 15 percent, a rate which would no doubt require some form of external guarantee.

Programming Costs This is the most difficult category to estimate, striking as it does to the heart of such unpredictable factors as labor agreements, copyright payments, negotiations with writers and producers for individual properties, as well as the mix between acquired and newly produced materials. There is a clear relationship between the quality, originality, and uniqueness of the program service and the percentage of subscribers willing to pay for it.

Existing estimates for pay network production costs do not have much predictive value for PACE, because they largely reflect a single commodity—acquired motion pictures from major Hollywood studios. Even projections for a pay TV service composed entirely of live performances (for instance, from Lincoln Center) are easier to estimate, despite uncertain labor costs, since such a channel would not include the many variables in our proposed mix of acquired and new productions. As a consequence, any cost estimate for programming is an educated guess at best.

Our basic annual projection for programming costs is a base of $15 million, plus 35 percent of PACE's gross revenues. It was assumed that $15 million was a rock bottom budget, without which the service could not be mounted. In an effort to increase this amount in direct proportion to the service's growing subscribership, we added 35 percent of the service's gross revenues per year.

Once the service turns cash-positive, we would expect subsequent surplus to be reinvested in programming.

Our basic programming budget, $15 million plus 35 percent of PACE's gross revenue, projects a significantly greater proportion of revenue being devoted to programming than is the case with HBO and Showtime. HBO currently spends around 20 to 22 percent of

subscriber payments,[5] with Showtime somewhat higher, due to a smaller number of subscribers, less favorable negotiating terms, and a higher percentage of revenues devoted to original programming. The ON-TV subscription service in Los Angeles reportedly spends 25 to 27 percent of subscriber payments (about $19 per subscriber) on programming, although the system is less than three years old. In earlier days, both Showtime and HBO spent a higher percentage on programs. Because the total sums paid to movie companies now are much higher, the pay cable networks have negotiated some flat rates, thus lowering the percentage.

We believe this service will have to produce more original programming than existing pay networks in order to attract subscribers, and this means higher programming costs. Original or co-produced material is less a function of the number of subscribers than of fixed costs, labor contracts, and other fairly absolute numbers. Acquisition of movies, on the other hand, tends to become more expensive as subscriber count grows.

Since some original material will probably be required from the first month of operation, our projections indicate the early years of operation will require an operating subsidy. However, even with this fact, there is a lower limit to which program costs can descend and still maintain a quality service that will attract paying customers. Hence, a basic programming budget of $15 million plus 35 percent of PACE's gross revenue (or $18.281 million in year one of the base case), while a high proportion of revenue, is not a lavish production budget. Much will depend upon the ability of the managers of the service to produce what original material it decides upon at relatively low prices. In addition, since initial subscriber count will be relatively low, payments for motion pictures, both domestic and foreign, will need to be relatively low. Similarly, we anticipate the need for a transition period of labor costs while revenues are demonstrably marginal. This may well be negotiable with unions, particularly those involved with the New York stage, in hopes of developing a market that would not otherwise exist. Finally, of course, the launch of a service at this rate would depend heavily

[5]Note that the text discusses percentages calculated on different bases. The discussion of HBO and other operating services is of a percentage of all subscriber payments for the service. E.g., if the subscriber pays $9.00 per month for HBO, the percentage devoted to programming is 20 to 22 percent of that figure, or about $1.95. The PACE programming budget is projected as $15 million plus 35 percent of PACE's revenue which, given a 50-50 PACE-cable operator split, is 17.5 percent of subscriber payments.

upon agreements with public television for certain rights advantages, on the premise that at a future point this assistance will yield revenues from the pay service that will benefit public broadcasting's main service.

Even though the programming budget is the most important cost, and thereby affects the point at which PACE can expect to break even, it is clear from examining the various cases that the engine powering the entire operation is overall growth in the subscriber universe.

Increases in the programming budget would delay breakeven, but would not preclude it because PACE would be selling to a constantly increasing number of customers. In other words, the relationship between the consumer appeal of higher cost programming and the ultimate breakeven point is a question of timing, rather than absolute figures.

With all these provisions, we still must emphasize that this model is only for illustrative purposes. It is far easier to project five, six years into the future, in order to illustrate more fully what a mature service might resemble. We have constructed a "dream" budget of roughly $35 million worth of programs for the fourth year of operation (1986). Table A-5 details the method by which we determined the amount to be expended in each programming category.

Income Statement and Summary Report The full *pro forma* income statement is presented for the base case (CASE A). The income statements for the other twelve cases (B through M) have been abbreviated, and are presented here in Summary Reports.

The income statement begins with a presentation of total revenues to the PACE enterprise. Progressing down the statement, various expenses are subtracted from revenue resulting in the annual surplus or deficit at the bottom of the report.

Expenses are presented in two broad groups. First are the more variable expenses. Variable expenses are those that are judged to be more closely linked with the volume of business as well as with the quantity and quality of the product. The second group includes more general expenses, those that are relatively fixed, regardless of the size of the customer base or the nature of the programming product. The total of these two groups is identified as total operating expense. Gross operating surplus is the difference between revenues and total operating expenses.

Two further expense items are shown: depreciation and interest. Depreciation is shown separately from the operating expenses

because it is a noncash item. It represents the annual amortization of earlier expenditures for electronic hardware. As such, it is not readily controllable on a year-by-year basis, nor does it represent an annual cash outlay.

The other expense item that is shown separately is interest. Interest expense is determined by decisions regarding the way in which the enterprise is financed, rather than the way the enterprise is operated. As such, it is more a function of overall policy decisions than are most other expenses. This is why it is shown separately.

Although each market penetration case has its own income statement, the 12 variations on the base case are presented in less detail using Summary Reports. The Summary Report simply reviews annual data regarding the overall industry, then shows the major effects on the income statement for the case at hand. Programming is the dominant operating expense, and is the only one shown separately on the Summary Report. The line labeled total operating expense includes the amount shown for programming expense. Interest and depreciation are still shown separately as on the full income statement. Annual surplus (deficit) is equal to PACE revenue less all expenses (total operating expense, interest and depreciation). Cumulative surplus (deficit) simply shows the net accumulation of all surpluses and deficits to date.

Investment

Capitalization All cases assume that the service will be capitalized at $30 million. Of this amount, it is assumed that in the first year of operations, the service is funded in the amount of $20 million. Half of this amount is from grants and half from loans. In year two, $10 million more is assumed to be provided, again half from grants and half from loans. This approach to capitalization requires, then, $15 million in grants over two years and $15 million in loans over two years. In all but the worst case, there is ample surplus to pay back the initial grants in later years (by 1991), should that be required. However, the model assumes no such repayment in that there are many possible applications of later year surpluses. This approach to capitalization remains the same in all cases tested.

Working Capital All current assets except cash are determined by the level of sales volume. Receivables are assumed to be approximately 12 percent of sales, inventories 15 percent, and other current assets 5 percent. Thus, for every $1.00 increase in sales an additional 32 cents of investment is required in these three current assets. Cash

Table A-5 Cost Projections: Typical Month Schedule for PACE

COMPONENTS:
—operating 210 hours per month (6 hours per night, plus 30 weekend hours)
—105 program slots averaging 2 hours
—21 new program slots to fill each month
—remainder comprised of repeats

PROGRAM CATEGORIES	YEARLY BUDGET	MONTHLY BUDGET	ORIGINAL HOURS PER MONTH
1. Motion pictures: 4 per month (1 blockbuster, 1 U.S. independent, 2 lesser foreign) @ average of $30,000 each with typical pay TV rights package (6 month window, total of 7-10 plays).	$1,440,000	$120,000	8
2. Operas: 1 new opera per month, 12 total per year 6 imported acquisitions (@ $60,000 each) 2 original premieres produced for pay (@ $500,000 each) 4 operas co-produced w/public TV (@ $150,000 per year for step-up fees).	1,960,000	163,333	3
3. Dance performances: 2 per month averaged from 6 imports (@ $60,000 each) 10 co-productions w/public TV (@ $100,000 each) 8 originals (@ $100,000 each).	2,160,000	180,000	4
4. Arts magazines: 7 half-hours per month of original production (@ $100,000 each).	8,400,000	700,000	3.5
5. Large scale musical performances: 2 orchestral scale productions per month	4,100,000	341,677	6

Table A-5 Continued

PROGRAM CATEGORIES	YEARLY BUDGET	MONTHLY BUDGET	ORIGINAL HOURS PER MONTH
24 total per year, including 10 imports (@ $60,000 each) 4 original productions (@ $500,000 each) 10 co-productions w/public TV (@ $150,000 for step-ups).			
6. Other musical performances: 2 events per month (jazz, chamber, solo concerts, rock events, etc. which are small-scale) 24 total per year: 14 originals (@ $100,000 each) 4 co-productions (@ $150,000) 6 acquisitions (@ $30,000).	1,780,000	148,333	4
7. Stage performances or TV drama/comedy productions: 2 per month 24 total per year 12 imports (@ $50,000 each) 6 originals (@ $500,000) 6 co-productions (@ $150,000)	4,500,000	375,000	4
8. Mini-series: 1 per month, running 4 hours Total of 12, of which 8 are imports (@ $50,000 per hour) 3 co-productions (@ $100,000 per hour) 1 original (@ $500,000 per hour)	4,800,000	400,000	4
9. Informational programming: including National Geographic-type, children's cultural/informational, and other random single short programs. Two events per month. (Same mix as item 7.)	4,500,000	375,000	4
	$33,640,000	$2,803,343	40.5

is calculated differently. The initial financing is assumed to be available virtually all in cash. Thereafter cash is increased by revenues and decreased by expenses (except depreciation). Cash is also decreased by expenditures for fixed assets such as technical equipment. This procedure works very well most of the time. However, it is possible for the enterprise to need more expenditures than there is cash available in a given year. When this happens the expenditure is made anyway. A "special loan" is arranged to make sure that the purchase is paid for and that the enterprise still has $50,000 as a minimum cash balance. This "special loan" appears as "Other Current Liabilities" on the balance sheet. Interest is paid on these loans at a 15 percent annual rate.

Current Liabilities also includes Accounts Payable and a miscellaneous item called "Current Liabilities #1" which is meant to take into account as yet unknown liabilities which may arise. Assuming the service will be fairly prompt in meeting its payables, Accounts Payable is estimated at 10 percent of sales. "Current Liabilities #1" shows another 10 percent of sales, and bears a 15 percent interest rate.

Fixed Assets The model allows provision for two classes of Fixed Assets: depreciable and other. Depreciable Assets includes the technical hardware used to produce and distribute programs. Other Fixed Assets is a "miscellany" item (included in the interest of conservatism). It is assumed to grow at about 5 percent per year.

Ending Balances Summary This ten year overview is primarily useful with regard to the cash affordability of the base case. The values in the "cash" column decline for some four years after initiation, then turn upward again as industry growth (and, to some extent, increasing penetration) begin to provide substantial surplus.

The very large cash balances shown in later years are not necessarily to be interpreted literally. That is, such balances could be available, but would more likely be reinvested in improved production or in additional assets.

Similarly, the column headed "Other Current Liabilities" should not be interpreted literally. This column portrays the amounts of money that may be needed in excess of the assumed original capitalization. In fact, these amounts could well be financed by initial grants or loans.

Observations on Investment The financing and capitalization of the base case is somewhat of a hybrid: It is not quite the way a fully entrepreneurial private venture would probably be structured, nor is it quite like a fully subsidized public service entity.

In the base case, losses in the first year eliminate all of the initial $15 million capitalization. This expectation will require (at a minimum) early assurances to would-be lenders that the second round of grant money will be forthcoming. Even so, at the close of 1983 the book value of total assets would be approximately $10 million shy of the amount of total liabilities. This expected situation would be intolerable to the ordinary commercial lender, under ordinary circumstances.

The implication is that either the PACE service will need more grant money up front, or it will need solid assurances that funding will subsequently become available to see it through the third or fourth year of operations.

All but one case (D) tested begins to show surpluses at least by the end of 1986. Although cumulative deficits up to that point might range from $4 million to $38 million, subsequent surpluses more than pay back any such deficits. Even Case D, which runs annual deficits until 1987, would recoup its total losses by 1993.

CASE A (Base Case)

5% Penetration, 3 Years to Half

1. ENDING BALANCES SUMMARY (in millions)

YEAR	REVENUE	CASH	OTHER CURRENT LIABILITIES	ANNUAL SURPLUS
1981	$0.00	19.950	$0.00	$0.00
1982	9.374	2.332	0.00	-15.590
1983	20.910	0.486	0.00	-9.649
1984	33.837	0.050	4.387	-2.990
1985	46.979	0.050	2.432	3.561
1986	60.092	7.384	0.00	11.141
1987	72.906	24.287	0.00	18.468
1988	85.270	33.204	0.00	25.829
1989	97.113	39.382	0.00	32.900
1990	108.418	49.640	0.00	39.675
1991	119.205	66.157	0.00	46.114

CASE A (Base Case continued)

2. SUMMARY REPORT (in millions)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total Basic Cable Subs	25.600	28.972	32.440	35.611	38.692	41.690	44.615	47.474	50.277	53.034
Eligible PACE Universe	16.829	20.929	25.065	28.848	32.490	36.003	39.399	42.691	45.891	49.013
Tot. PACE Subs	0.174	0.387	0.627	0.870	1.113	1.350	1.579	1.798	2.008	2.208
PACE Revenue	9.374	20.910	33.837	46.979	60.092	72.906	85.270	97.113	108.418	119.205
Programming	18.281	22.319	26.843	31.443	36.032	40.517	44.845	48.990	52.946	56.772
Tot. Operating Exp.	23.294	28.267	33.946	39.679	45.332	50.984	55.819	60.403	64.779	68.953
Interest Exp.	1.570	2.102	2.661	3.514	3.418	3.247	3.436	3.618	3.791	3.957
Depreciation Exp.	0.100	0.190	0.221	0.224	0.202	0.206	0.186	0.192	0.173	0.181
Annual Surplus (Deficit)	−15.590	−9.649	−2.990	3.561	11.141	18.468	25.829	32.900	39.675	46.114
Cum. Surplus (Deficit)	−15.590	−25.239	−28.230	−24.668	−13.528	4.940	30.769	63.669	103.344	149.458

CASE A (Base Case continued)

3. INDUSTRY PROJECTIONS

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
New Miles Constructed	50000.000	50000.000	50000.000	40000.000	35000.000	30000.000	25000.000	20000.000	15000.000	10000.000
New Homes Passed	5.000	5.000	5.000	4.000	3.500	3.000	2.500	2.000	1.500	1.000
New Basic Subs	2.000	2.000	2.000	1.600	1.400	1.200	1.000	0.800	0.600	0.400

Cum. Basic Subs—New	6.000	8.000	10.000	11.600	13.000	14.200	15.200	16.000	16.600	17.000
Cum. Basic Subs—Old	19.600	20.972	22.440	24.011	25.692	27.490	29.415	31.474	33.677	36.034
Total Basic Cable Subs	25.600	28.972	32.440	35.611	38.692	41.690	44.615	47.474	50.277	53.034
Net Inc. in Subs	7.282	3.372	3.468	3.171	3.081	2.998	2.924	2.859	2.803	2.757
Tot. New Homes Passed	15.000	20.000	25.000	29.000	32.500	35.500	38.000	40.000	41.500	42.500
Tot. Old Base Passed	36.058	36.599	37.148	37.705	38.271	38.845	39.427	40.019	40.619	41.228
Tot. Homes Passed	51.058	56.599	62.148	66.705	70.771	74.345	77.427	80.019	82.119	83.728
Pay Subs of New Subs	4.800	6.400	8.000	9.280	10.400	11.360	12.160	12.800	13.280	13.600
Pay Subs of Old Subs	7.840	8.389	8.976	9.604	10.277	10.996	11.766	12.589	13.471	14.414
Tot. Pay Subs	12.640	14.789	16.976	18.884	20.677	22.356	23.926	25.389	26.751	28.014
Basic Revenue	2560.026	2897.228	3244.034	3561.116	3869.194	4169.038	4461.471	4747.373	5027.690	5303.428
Pay-Cable Revenue	1516.812	1774.669	2037.136	2286.136	2481.213	2682.738	2871.106	3046.739	3210.091	3361.645
Tot. Basic & Pay Revenue	4076.839	4671.897	5281.170	5827.252	6350.408	6851.776	7332.576	7794.113	8237.781	8665.073
Cum. Basic Subs—Old	19.600	20.972	22.440	24.011	25.692	27.490	29.415	31.474	33.677	36.034
Less: Non-Conv.	8.771	8.043	7.376	6.763	6.202	5.687	5.215	4.783	4.386	4.022
Old Sub Universe	10.829	12.929	15.065	17.248	19.490	21.803	24.199	26.691	29.291	32.013
Cum. Basic Subs—New	6.000	8.000	10.000	11.600	13.000	14.200	15.200	16.000	16.600	17.000
Eligible Pace Universe	16.829	20.929	25.065	28.848	32.490	36.003	39.399	42.691	45.891	49.013
Net Incr. in Universe		4.100	4.136	3.783	3.642	3.513	3.396	3.292	3.200	3.121
Total New Homes Passed	15.000	20.000	25.000	29.000	32.500	35.500	38.000	40.000	41.500	42.500
Total Old Base Passed	36.058	36.599	37.148	37.705	38.271	38.845	39.427	40.019	40.619	41.228
Tot. Homes Passed	51.058	56.599	62.148	66.705	70.771	74.345	77.427	80.019	82.119	83.728
Pace Subs—New	0.062	0.148	0.250	0.350	0.445	0.532	0.609	0.674	0.728	0.766
Pace Subs—Old	0.112	0.239	0.377	0.520	0.668	0.818	0.970	1.124	1.281	1.442
Tot. Pace Subs	0.174	0.387	0.627	0.870	1.113	1.350	1.579	1.798	2.008	2.208
Basic Revenue	2560.026	2897.228	3244.034	3561.116	3869.194	4169.038	4461.471	4747.373	5027.690	5303.428
Pay-Cable Revenue	1516.812	1774.669	2037.136	2286.136	2481.213	2682.738	2871.106	3046.739	3210.091	3361.645
Pace Revenue	9.374	20.810	33.837	46.979	60.092	72.906	85.270	97.113	108.418	119.205
Pace Market Share %	1.236	2.357	3.322	4.146	4.844	5.435	5.940	6.375	6.755	7.092

Note: All but top line are in millions.

CASE A (Base Case continued)

4. INCOME STATEMENT (in millions)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Revenue	9.374	20.910	33.837	46.979	60.092	72.906	85.270	97.113	108.418	119.205
Field Sales	0.416	0.499	0.582	0.749	0.832	0.832	0.832	0.832	0.832	0.832
Marketing Manager	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
Ad & Promotion Exp.	0.447	0.874	1.353	1.840	2.326	2.800	3.258	3.697	4.115	4.515
Tot. Marketing Exp.	0.963	1.474	2.036	2.689	3.258	3.732	4.190	4.629	5.047	5.447
Programming	18.281	22.319	26.843	31.443	36.032	40.517	44.845	48.990	52.946	56.722
Tot. Direct Exp.	19.244	23.792	28.879	34.131	39.290	44.249	49.035	53.618	57.994	62.169
Programming Dept.	0.250	0.325	0.422	0.549	0.714	0.928	0.928	0.928	0.928	0.928
Tech. Operations	0.300	0.500	0.800	0.900	0.900	0.950	1.000	1.000	1.000	1.000
Financial Dept.	0.250	0.325	0.422	0.549	0.714	0.928	0.928	0.928	0.928	0.928
General Management	0.250	0.325	0.422	0.549	0.714	0.928	0.928	0.928	0.928	0.928
Transponder Lease	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
Tot. Operating Exp.	23.294	28.267	33.946	39.679	45.332	50.984	55.819	60.403	64.779	68.953
Gross Operating Surplus	−13.920	−7.357	−0.109	7.300	14.760	21.922	29.451	36.710	43.640	50.252
Depreciation Exp.	0.100	0.190	0.221	0.224	0.202	0.206	0.186	0.192	0.173	0.181
Interest Exp	1.570	2.102	2.661	3.514	3.418	3.247	3.436	3.618	3.791	3.957
Net Operating Surplus	−15.590	−9.649	−2.990	3.561	11.141	18.468	25.829	32.900	39.675	46.114

CASE A (Base Case continued)

5. BALANCE SHEET (in millions)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Cash	2.332	0.486	0.050	0.050	7.384	24.267	33.204	39.382	49.640	66.157
Receivables	1.125	2.509	4.060	5.637	7.211	8.749	10.232	11.654	13.010	14.305
Inventories	1.406	3.137	5.076	7.047	9.014	10.936	12.791	14.567	16.263	17.881
Oth. Curr. Assets	0.469	1.046	1.692	2.349	3.005	3.645	4.264	4.856	5.421	5.960
Tot. Curr. Assets	5.332	7.178	10.878	15.083	26.613	47.597	60.491	70.459	84.334	104.302
Depreciable Base	1.000	2.000	2.500	2.750	2.750	3.000	3.000	3.250	3.250	3.500
Less: Accum. Depr.	−0.100	−0.290	−0.511	−0.735	−0.936	−1.143	−1.328	−1.521	−1.694	−1.874
Other Fixed Assets	0.052	0.055	0.058	0.061	0.064	0.067	0.070	0.074	0.078	0.081
Tot. Assets	6.284	8.943	12.925	17.159	28.490	49.522	62.233	72.262	85.968	106.009
Accounts Payable	0.937	2.091	3.384	4.698	6.009	7.291	8.527	9.711	10.842	11.921
Curr. Lia. #1	0.937	2.091	3.384	4.698	6.009	7.291	8.527	9.711	10.842	11.921
Other Curr. Lia.	0.000	0.000	4.387	2.432	0.000	0.000	0.000	0.000	0.000	0.000
Tot. Curr. Liabilities	1.875	4.182	11.155	11.827	12.018	14.581	17.054	19.423	21.684	23.841
L.T. Debt	10.000	15.000	15.000	15.000	15.000	15.000	15.000	15.000	15.000	15.000
Tot. Liabilities	11.875	19.182	26.155	26.827	27.018	29.581	32.054	34.423	36.684	38.841
Funds Fr. Grants #1	10.000	15.000	15.000	15.000	15.000	15.000	15.000	15.000	15.000	15.000
Cum. Surplus	−15.590	−25.239	−28.230	−24.668	−13.528	4.940	15.179	22.839	34.285	52.168
Tot. Permanent Cap.	−5.590	−10.239	−13.230	−9.668	1.472	19.940	30.179	37.839	49.285	67.168
Tot. Capital	6.284	8.943	12.925	17.159	28.490	49.522	62.233	72.262	85.968	106.009

CASE B 4% Penetration, 2 Years to Half

SUMMARY REPORT (in millions)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total Basic Cable Subs	25.600	28.972	32.440	35.611	38.692	41.690	44.615	47.474	50.277	53.034
Eligible PACE Universe	16.829	20.929	25.065	28.848	32.490	36.003	39.399	42.691	45.891	49.013
Tot. PACE Subs	0.197	0.419	0.648	0.865	1.070	1.260	1.437	1.601	1.755	1.899
PACE Revenue	10.647	22.603	34.998	46.733	57.772	68.046	77.581	86.450	94.745	102.559
Programming	18.726	22.911	27.249	31.357	35.220	38.816	42.153	45.257	48.161	50.898
Tot. Operating Exp.	23.787	28.923	34.396	39.584	44.434	49.103	52.843	56.276	59.486	62.511
Interest Exp.	1.580	2.124	2.682	3.170	3.034	3.194	3.342	3.480	3.609	3.730
Depreciation Exp.	0.100	0.190	0.221	0.224	0.202	0.206	0.186	0.192	0.173	0.181
Annual Surplus (Deficit)	−14.820	−8.634	−2.300	3.755	10.103	15.543	21.209	26.501	31.476	36.138
Cum. Surplus (Deficit)	−14.820	−23.453	−25.753	−21.999	−11.896	3.647	24.856	51.358	82.834	118.972

CASE C 4% Penetration, 3 Years to Half

SUMMARY REPORT (in millions)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total Basic Cable Subs	25.600	28.972	32.440	35.611	38.692	41.690	44.615	47.474	50.277	53.034
Eligible PACE Universe	16.829	20.929	25.065	28.848	32.490	36.003	39.399	42.691	45.891	49.013
Tot. PACE Subs	0.139	0.310	0.501	0.698	0.890	1.080	1.263	1.439	1.606	1.768
PACE Revenue	7.499	16.728	27.070	37.583	48.073	58.325	68.216	77.690	88.735	95.364
Programming	17.625	20.855	24.474	28.154	31.826	35.414	38.876	42.192	45.357	48.377
Tot. Operating Exp.	22.568	26.649	31.327	36.043	40.680	45.341	49.219	52.886	56.386	59.728
Interest Exp.	1.556	2.057	2.986	4.490	5.317	5.351	4.579	5.249	6.997	9.244
Depreciation Exp.	0.100	0.190	0.221	0.224	0.202	0.206	0.186	0.192	0.173	0.181
Annual Surplus (Deficit)	−16.726	−12.167	−7.464	−3.174	1.874	7.427	14.232	19.363	23.178	26.213
Cum. Surplus (Deficit)	−16.726	−28.893	−36.356	−39.530	−37.656	−30.229	−15.997	3.367	26.545	52.758

CASE D 4% Penetration, 4 Years to Half

SUMMARY REPORT (in millions)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total Basic Cable Subs	25.600	28.972	32.440	35.611	38.692	41.690	44.615	47.474	50.277	53.034
Eligible PACE Universe	16.829	20.929	25.065	28.848	32.490	36.003	39.399	42.691	45.891	49.013
Tot. PACE Subs	0.107	0.245	0.406	0.577	0.753	0.931	1.107	1.281	1.450	1.614
PACE Revenue	5.784	13.241	21.948	31.155	40.672	50.272	59.801	69.160	78.287	87.153
Programming	17.024	19.634	22.682	25.904	29.235	32.595	35.931	39.206	42.400	45.503
Tot. Operating Exp.	21.904	25.299	29.345	33.555	37.816	42.224	45.962	49.584	53.117	56.548
Interest Exp.	1.543	2.018	3.329	5.304	6.804	7.711	8.015	10.120	13.851	18.899
Depreciation Exp.	0.100	0.190	0.221	0.224	0.202	0.206	0.186	0.192	0.173	0.181
Annual Surplus (Deficit)	−17.764	−14.266	−10.947	−7.928	−4.149	0.130	5.639	9.264	11.146	11.525
Cum. Surplus (Deficit)	−17.764	−32.030	−42.977	−50.904	−55.054	−54.923	−49.285	−40.021	−28.874	−17.350

CASE E 5% Penetration, 2 Years to Half

SUMMARY REPORT (in millions)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total Basic Cable Subs	25.600	28.972	32.440	35.611	38.692	41.690	44.615	47.474	50.277	53.034
Eligible PACE Universe	16.829	20.929	25.065	28.848	32.490	36.003	39.399	42.691	45.891	49.013
Tot. PACE Subs	0.246	0.523	0.810	1.082	1.337	1.575	1.796	2.001	2.193	2.374
PACE Revenue	13.309	28.254	43.748	58.417	72.215	85.057	96.976	108.062	118.431	128.199
Programming	19.658	24.889	30.312	35.446	40.275	44.770	48.941	52.822	56.451	59.870
Tot. Operating Exp.	24.817	31.110	37.782	44.106	50.024	55.687	60.350	64.641	68.654	72.434
Interest Exp.	1.600	2.187	2.790	3.016	3.230	3.430	3.615	3.788	3.949	4.100
Depreciation Exp.	0.100	0.190	0.221	0.224	0.202	0.206	0.186	0.192	0.173	0.181
Annual Surplus (Deficit)	−13.208	−5.232	2.955	11.071	18.760	25.734	32.825	39.441	45.655	51.484
Cum Surplus (Deficit)	−13.208	−18.440	−15.485	−4.415	14.345	40.080	72.904	112.346	158.001	209.485

CASE F 5% Penetration, 4 Years to Half

SUMMARY REPORT (in millions)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total Basic Cable Subs	25.600	28.972	32.440	35.611	38.692	41.690	44.615	47.474	50.277	53.034
Eligible PACE Universe	16.829	20.929	25.065	28.848	32.490	36.003	39.399	42.691	45.891	49.013
Tot. PACE Subs	0.134	0.306	0.508	0.721	0.941	1.164	1.384	1.601	1.812	2.017
PACE Revenue	7.229	16.551	27.435	38.944	50.840	62.840	74.752	86.450	97.858	108.941
Programming	17.530	20.793	24.602	28.631	32.794	36.994	41.163	45.257	49.250	53.129
Tot. Operating Exp.	22.464	26.580	31.468	36.569	41.751	47.088	51.748	56.276	60.692	64.981
Interest Exp.	1.554	2.053	3.024	4.522	5.265	5.085	3.918	3.981	4.848	5.841
Depreciation Exp.	0.100	0.190	0.221	0.224	0.202	0.206	0.186	0.192	0.173	0.181
Annual Surplus (Deficit)	−16.889	−12.272	−7.278	−2.371	3.622	10.460	18.899	26.001	32.146	37.938
Cum. Surplus (Deficit)	−16.889	−29.161	−36.440	−38.811	−35.188	−24.728	−5.829	20.172	52.318	90.256

CASE G 6% Penetration, 2 Years to Half

SUMMARY REPORT (in millions)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total Basic Cable Subs	25.600	28.972	32.440	35.611	38.692	41.690	44.615	47.474	50.277	53.034
Eligible PACE Universe	16.829	20.929	25.065	28.848	32.490	36.003	39.399	42.691	45.891	49.013
Tot. PACE Subs	0.296	0.628	0.972	1.298	1.605	1.890	2.155	2.401	2.632	2.849
PACE Revenue	15.970	33.905	52.498	70.100	86.858	102.068	116.371	129.675	142.117	153.839
Programming	20.590	26.867	33.374	39.535	45.330	50.724	55.730	60.386	64.741	68.844
Tot. Operating Exp.	25.847	33.297	41.168	48.628	55.614	62.271	67.856	73.006	77.821	82.358
Interest Exp.	1.620	2.249	2.898	3.169	3.426	3.655	3.888	4.095	4.288	4.470
Depreciation Exp.	0.100	0.190	0.221	0.224	0.202	0.206	0.186	0.192	0.173	0.181
Annual Surplus (Deficit)	−11.597	−1.831	8.210	18.079	27.417	35.926	44.440	52.382	59.834	66.830
Cum. Surplus (Deficit)	−11.597	−13.427	−5.217	12.862	40.279	76.204	120.645	173.026	232.861	299.691

CASE H 6% Penetration, 3 Years to Half

SUMMARY REPORT (in millions)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total Basic Cable Subs	25.600	28.972	32.440	35.611	38.692	41.690	44.615	47.474	50.277	53.034
Eligible PACE Universe	16.829	20.929	25.065	28.848	32.490	36.003	39.399	42.691	45.891	49.013
Tot. PACE Subs	0.208	0.465	0.752	1.044	1.335	1.620	1.895	2.158	2.409	2.649
PACE Revenue	11.249	25.092	40.605	56.374	72.110	87.487	102.324	116.536	130.102	143.046
Programming	18.937	23.782	29.212	34.731	40.238	45.621	50.813	55.787	60.536	65.066
Tot. Operating Exp.	24.020	29.886	36.565	43.315	49.983	56.628	62.420	67.920	73.171	78.181
Interest Exp.	1.584	2.148	2.743	2.977	3.214	3.447	3.674	3.891	4.100	4.299
Depreciation Exp.	0.100	0.190	0.221	0.224	0.202	0.206	0.186	0.192	0.173	0.181
Annual Surplus (Deficit)	−14.455	−7.131	1.076	9.858	18.712	27.208	36.045	44.532	52.658	60.386
Cum. Surplus (Deficit)	−14.455	−21.586	−20.511	−10.653	8.058	35.265	71.310	115.842	168.500	228.886

CASE I 6% Penetration, 4 Years to Half

SUMMARY REPORT (in millions)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total Basic Cable Subs	25.600	28.972	32.440	35.611	38.692	41.690	44.615	47.474	50.277	53.034
Eligible PACE Universe	16.829	20.929	25.065	28.848	32.490	36.003	39.399	42.691	45.891	49.013
Tot. PACE Subs	0.161	0.368	0.610	0.865	1.130	1.398	1.661	1.921	2.175	2.421
PACE Revenue	8.675	19.861	32.922	46.733	61.008	75.408	89.702	103.740	117.430	130.729
Programming	18.036	21.951	26.523	31.357	36.353	41.393	46.396	51.309	56.101	60.755
Tot. Operating Exp.	23.024	27.861	33.592	39.584	45.686	51.952	57.535	62.968	68.266	73.414
Interest Exp.	1.565	2.089	2.720	3.740	3.726	3.273	3.488	3.701	3.909	4.111
Depreciation Exp.	0.100	0.190	0.221	0.224	0.202	0.206	0.186	0.192	0.173	0.181
Annual Surplus (Deficit)	−16.013	−10.279	−3.610	3.185	11.394	19.976	28.493	36.879	45.082	53.023
Cum. Surplus (Deficit)	−16.013	−26.292	−29.903	−26.718	−15.323	4.653	33.146	70.025	115.107	168.130

CASE J 7% Penetration, 2 Years to Half

SUMMARY REPORT (in millions)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total Basic Cable Subs	25.600	28.972	32.440	35.611	38.692	41.690	44.615	47.474	50.277	53.034
Eligible PACE Universe	16.829	20.929	25.065	28.848	32.490	36.003	39.399	42.691	45.891	49.013
Tot. PACE Subs	0.345	0.733	1.134	1.515	1.872	2.205	2.514	2.802	3.070	3.324
PACE Revenue	18.632	39.556	61.247	81.783	101.101	119.080	135.766	151.287	165.803	179.478
Programming	21.521	28.845	36.437	43.624	50.385	56.678	62.518	67.950	73.031	77.817
Tot. Operating Exp.	26.877	35.484	44.555	53.150	61.204	68.855	75.363	81.370	86.989	92.281
Interest Exp.	1.640	2.311	3.006	3.323	3.622	3.901	4.161	4.403	4.628	4.840
Depreciation Exp.	0.100	0.190	0.221	0.224	0.202	0.208	0.186	0.192	0.173	0.181
Annual Surplus (Deficit)	-9.985	1.571	13.465	25.087	36.074	46.117	56.056	65.322	74.013	82.177
Cum. Surplus (Deficit)	−9.985	−8.414	5.051	30.138	66.212	112.329	168.385	233.707	307.720	389.897

CASE K 7% Penetration, 3 Years to Half

SUMMARY REPORT (in millions)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total Basic Cable Subs	25.600	28.972	32.440	35.611	38.692	41.690	44.615	47.474	50.277	53.034
Eligible PACE Universe	16.829	20.929	25.065	28.848	32.490	36.003	39.399	42.691	45.891	49.013
Tot. PACE Subs	0.243	0.542	0.877	1.218	1.558	1.890	2.211	2.518	2.811	3.091
PACE Revenue	13.124	29.275	47.372	65.770	84.128	102.068	119.378	135.958	151.786	166.887
Programming	19.593	25.246	31.580	38.020	44.445	50.724	56.782	62.585	68.125	73.410
Tot. Operating Exp.	24.745	31.505	39.185	46.952	54.635	62.271	69.020	75.438	81.563	87.408
Interest Exp.	1.598	2.193	2.825	3.099	3.374	3.646	3.911	4.165	4.408	4.640
Depreciation Exp.	0.100	0.190	0.221	0.224	0.202	0.206	0.186	0.192	0.173	0.181
Annual Surplus (Deficit)	−13.320	−4.613	5.142	15.496	25.918	35.945	46.261	56.163	65.641	74.658
Cum. Surplus (Deficit)	−13.320	−17.933	−12.791	2.704	28.622	64.567	110.828	166.991	232.632	307.291

CASE L 7% Penetration, 4 Years to Half

SUMMARY REPORT (in millions)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total Basic Cable Subs	25.600	28.972	32.440	35.611	38.692	41.690	44.615	47.474	50.277	53.034
Eligible PACE Universe	16.829	20.929	25.065	28.848	32.490	36.003	39.399	42.691	45.891	49.013
Tot. PACE Subs	0.187	0.429	0.711	1.010	1.318	1.629	1.938	2.241	2.537	2.824
PACE Revenue	10.121	23.171	38.409	54.522	71.176	87.978	104.653	121.030	137.002	152.517
Programming	18.542	23.110	28.443	34.083	39.91[illegible]	45.792	51.628	57.360	62.951	68.381
Tot. Operating Exp.	23.583	29.142	35.716	42.599	49.622	56.817	63.321	69.660	75.841	81.846
Interest Exp.	1.576	2.125	2.712	3.002	3.193	3.444	3.695	3.943	4.185	4.421
Depreciation Exp.	0.100	0.190	0.221	0.224	0.202	0.206	0.186	0.192	0.173	0.181
Annual Surplus (Deficit)	−15.138	−8.286	−0.239	8.697	18.160	27.509	37.451	47.235	56.802	66.068
Cum. Surplus (Deficit)	−15.138	−23.424	−23.663	−14.966	3.194	30.703	68.154	115.389	172.192	238.260

CASE M 10% Penetration, 5 Years to Half

SUMMARY REPORT (in millions)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total Basic Cable Subs	25.600	28.972	32.440	35.611	38.692	41.690	44.615	47.474	50.277	53.034
Eligible PACE Universe	16.829	20.929	25.065	28.848	32.490	36.003	39.399	42.691	45.891	49.013
Tot. PACE Subs	0.218	0.507	0.853	1.228	1.624	2.033	2.447	2.861	3.271	3.676
PACE Revenue	11.764	27.366	46.052	66.307	87.722	109.792	132.137	154.485	176.648	198.501
Programming	19.117	24.578	31.118	38.207	45.703	53.427	61.248	69.070	76.827	84.475
Tot. Operating Exp.	24.219	30.766	38.674	47.160	56.026	65.260	73.959	82.608	91.186	99.644
Interest Exp.	1.588	2.168	2.801	3.093	3.405	3.731	4.064	4.400	4.733	5.064
Depreciation Exp.	0.100	0.190	0.221	0.224	0.202	0.208	0.186	0.192	0.173	0.181
Annual Surplus (Deficit)	−14.143	−5.758	4.357	15.830	28.090	40.594	53.928	67.285	80.555	93.613
Cum. Surplus (Deficit)	−14.143	−19.902	−15.545	0.286	28.375	68.969	122.897	190.183	270.738	364.351

APPENDIX B

A Prototype Program Schedule for PACE

We have prepared the following prototype schedule for the month of April, 1980, based on the assumptions about format and program distribution, and hours of operation and repeat policy given in Table A-5 in *Appendix A*. We have not attempted to estimate the actual costs of this prototype schedule, but do feel that a schedule of this type will be easily possible once PACE reaches financial maturity. No discussions have been held with the artists, copyright holders, performance companies, distributors, or producers involved; we make no claims about the availability of the illustrative programs.

The programs selected for this schedule represent a range of performances and material available throughout the country during March, 1980. This schedule is not, in other words, an attempt to market the PACE service.

What we hope the prototype does is give a flavor of the enormous wealth of programming possibilities available to a service with a nonprofit mission and the funds to support a range of production and co-production. We have not, of course, listed who the producers of these programs would be, but assume that PACE would rely upon a large body of talent within as well as outside public broadcasting. In short, the most important part of this exercise is not to plan and create PACE for a month, but to show the kinds of scheduling considerations that have been part of our planning process, that have affected our program budget, and therefore underlie our projections for PACE's success.

Each weekday night features four or more programs, for an average of 6 hours a night. Saturday and Sunday schedules are

longer—usually about 10 hours, for a total of about 210 hours per month. This schedule offers nearly 40 different programs, including several multi-part series. Some are premieres, usually featured at prime viewing time on a weekend. Other programs are "encores" from previous months that have proven to be popular with audiences.

These 40 programs will, with repeats and multi-episode formats, fill more than 150 program slots. This generous repeat policy is, of course, based in part on a feeling that it is better to make fewer programs well than to try to fill over 200 hours with original programs each month. More significantly, however, we feel that repeats are an essential part of PACE's place in the new television. Faced with an abundance of programming, we believe audiences will begin to use television in much the same way they attend the theater. PACE viewers will plan to watch individual programs and will therefore welcome the flexibility that repeats will offer.

PACE's similarities to theatrical film exhibition can be seen in the retrospective or theme orientation of this sample program schedule. We have assumed that the recently released German feature, *Our Hitler,* is available for April exhibition. To clarify that film's complex examination of German culture, we have featured the operatic work of Richard Wagner, a key figure in the film. A documentary about Seattle's Wagner Festival complements these, as well. The schedule features opera-on-film selections and a retrospective of the films of Jean-Luc Godard, an important influence on the director of *Our Hitler.*

The mini-series, both acquired (*Pennies from Heaven*) and original (Pynchon's *V*), are also highlighted, as are original television productions of stage plays and music—classical, popular, and avant garde.

Finally, we have offered a range of "magazines" (called "Keeping PACE") that serve two purposes: as a sort of video program guide to the PACE schedule in a particular area, and as a survey of the month's news in such fields as film, theater, opera, dance, popular music, fashion, and art. Each would be repeated three or four times each month, and would premiere during the first week of the month.

Finally, this table is written as if it were the PACE program guide, but without the detailed program notes and production data that we presume PACE subscribers would enjoy.

April on PACE

Drama on PACE

New Drama this Month

- ***DA*** starring Barnard Hughes, a new PACE production of the smash Broadway comedy. Best Play of 1978, Tony Award and Drama Critics Award. First time on television anywhere.

- Also this month, an award-winning new American play direct from the New American Play Festival of the Actors Theatre of Louisville. Michael Kassin's ***They're Coming to Make It Brighter*** is a warm and popular tale of the habitués of an old art deco office building and their reactions as it is being "remodeled."

  Actors Theatre of Louisville has become an internationally famous breeding ground for major new theatrical works. This festival, in its fourth year, premiered nine new plays, several of which will be presented by PACE in subsequent months.

- Joseph Papp presents Peter Parnell's lighthearted romantic comedy about love, adultery, and suicide, ***The Sorrows of Stephen***, taped at New York's Public Theater. The hit of this season at the Public Theater, the play, presented here for the first time on television, has recently been optioned by a film production company.

Encore Drama this Month

- Showing again this month is ***Johnny on a Spot***, a political comedy by Charles MacArthur, co-author of ***The Front Page*** and ***Twentieth Century***. This seldom-revived farce was taped at the Brooklyn Academy of Music, and features the acclaimed new repertory group, the BAM Theatre Company.

Films on PACE

New Films this Month

- ***Our Hitler: A Film From Germany***, by Hans-Jürgen Syberberg. First U.S. television showing of this epic 1978 German film cycle.

  Syberberg examines the destruction of German culture during the Nazi years and shows the roots of Nazism in European culture and economics. Influenced by the work of the early German expressionistic filmmakers and by the stage work of Bertolt Brecht, the film is a complex and disturbing masterpiece.

  The film, which runs for seven hours, will be shown twice during April in sequence, with intermission breaks that give the background of the making of this extraordinary work. In addition, each of the four parts will be shown several times throughout the month. The four sections are: "The Grail," "A German Dream," "The End of a Winter's Tale," and "We, the Children of Hell."

- ***A Woman is a Woman*** by Jean-Luc Godard. Another in our retrospective of this major French "new wave" filmmaker. Starring Anna Karina. A light, but trenchant satire of musical comedy.

- ***Don Giovanni***, Joseph Losey's acclaimed film treatment of Mozart's greatest opera, starring Ruggero Raimondi, Jose Van Dam, Edda Moser, Teresa Berganza, Kenneth Riegel. Another in our series of opera-on-film, *Don Giovanni* is shown in entirety twice this month.

- ***Head over Heels*** (1979), Joan Micklin Silver's version of the Ann Beattie novel *Chilly Scenes of Winter* starring John Heard, Mary Beth Hurt, and Gloria Grahame. A romantic comedy which examines the way we live today.

Encore Films this Month

- ***An American Friend*** (1977) by German filmmaker Wim Wenders, based on the Patricia Highsmith intrigue novels. This re-interpretation of the classic film noir genre involves art theft, faked health documents, hired murderers, and mysterious strangers.

- ***Madama Butterfly***, the seldom seen version by Jean Pierre Ponnelle of Puccini's classic. Also part of the opera-on-film series.

- ***Two or Three Things I Knew About Her***, and ***Masculin/ Feminin***, two return runs of the Godard classics.

- ***The War at Home***, by Glenn Silber and Barry Alexander Brown. The 1979 Academy Award nominee for best Documentary Film. About the radicalization of Madison, Wisconsin during the Vietnam War era.

- ***Love on the Run*** (1978). The final film in Francois Truffaut's series about his semi-autobiographical hero played by Jean-Pierre Léaud, who began the role in *The 400 Blows*. Marie-France Pisier co-stars.

Opera on PACE

New Opera this Month

- In our preparation for Seattle's Wagner Festival this summer, PACE presents the first opera in the magnificent Ring Cycle, ***Das Rhinegold***, taped last summer at the Bayreuth Festival in West Germany. (Note: see Specials for a description of the PACE exclusive documentary on the Seattle Wagner Festival.) A complement to the "operatic" Syberberg film cycle, ***Our Hitler***.

Encore Opera this Month

- This month's encore opera is the Metropolitan Opera's production of Puccini's *Tosca*, with Carol Neblett.

- Also, don't forget the opera-on-film series that continues this month on PACE (see above).

Dance on PACE

New Dance this Month

- This month we are showcasing the **Martha Graham Dance Company**, from Lincoln Center in New York, in advance of its broadcast on PBS this fall. The ballets shown include the Gra-

ham classic "Appalachian Spring," with Rudolf Nureyev, and "The Owl and the Pussycat," with Liza Minelli.

- **The National Dance Company of Senegal**—Colorful, exciting, talented, this major national troupe was taped at New York's Beacon Theatre.

Encore Dance this Month

- Encore presentations this month include the **Choreographers Showcase** of Los Angeles, and **Short Subjects**, the imaginative dancing of Gary Lund and Rich Rease taped at the Walker Art Center, Minneapolis.

Longform Series on PACE

- Thomas Pynchon's ***V***, one of the most influential literary works since World War II, is a panoramic epic that spans the history of the twentieth century and three continents. Two generations of original and striking characters search for the mysterious "V" in an episodic and twisting plot of dazzling complexity. An all-star international cast in this world premiere 13-week series beginning this month.

- Finishing up this month is the mordantly zany musical drama ***Pennies from Heaven***, a British production about the mishaps of a 1930s sheet music salesman and his less than amorous wife.

Music on PACE

New Music this Month

- **Los Angeles Philharmonic**, conducted by Carlo Maria Giulini, featuring Vladimir Ashkenazy on piano. A live concert from the Dorothy Chandler Pavilion, Los Angeles Music Center. Featured works include Beethoven's Symphony No. 2, and Brahms' Piano Concerto No. 1.

- **Tito Puente**, New York salsa's bandleader-instrumentalist extraordinaire is recorded in a first of a kind concert for marimba and percussion, with a full back up band. From Soundscape in New York.

- Live from Chicago Orchestra Hall, baritone **Dietrich Fischer-Dieskau** in an all-Schumann recital.

- **John Cale**, late of the seminal rock group Velvet Underground, has returned from England to enliven the new wave music scene. A rare public appearance at Los Angeles' Whiskey A Go Go. With **The Zeros**.

Encore Music this Month

- **Renata Scotto**, soprano, with John Atkins on piano, sings arias and songs by Donizetti, Verdi, Catalani, Rossini, Puccini, Respighi, and Mascagni. First appearance at Carnegie Hall in five years.

- **The New Orleans Jazz Festival**, almost as famous as that city's famous Mardi Gras celebration. Featuring the greatest instrumental and vocal jazz artists of our time.

- **Yehudi and Hephzibah Menuhin**, at the Valley Forge Music Fair, Devon, Pa. in duet playing Brahms and Franck Sonatas in A; Bartok, Debussy, and Wieniawski pieces. Plus solos performed by Yehudi Menuhin.

- **The Kitchen**—a compendium of 1979's greatest music and performance programs from Soho, New York City. This leading multi-disciplinary "alternative space" mixes jazz, rock, video, dance, and contemporary concert music.

- **Teddy Wilson: Master Class in Jazz Piano**, is a rare experience with this great of the keyboard. Filmed at the Mannes College of Music, New York City.

Specials on PACE

New Specials this Month

- **"New Glass,"** a documentary timed for the opening of an international tour of the major contemporary glass exhibit called New Glass: A Worldwide Survey. Beginning at Washington's Renwick Gallery, the exhibit will travel to New York, San Francisco, England, France, and Japan. Featuring 271 individ-

ual or groups of hand-made glass objects by 196 artists from 28 countries, the exhibit shows that glass is the "art of the 80s." This documentary takes us to the glass-blowing studios of several artists, as well as sharing the beauty of the exhibit.

- **TV Dinner,** a musical-comedy-thriller for children mounted by the San Francisco Mime Troupe. Filmed at the Julia Morgan Theatre, Berkeley, California. Children will love this wonderful entertainment.

Encore Specials this Month

- **Nam June Paik** in retrospective. The Korean composer/video artist, often called the George Washington of video art, shows you the extraordinary range of his fast-moving, whimsical and visually beautiful programs.

- The opening of the **Metropolitan Museum of Art's Andre Meyer Galleries,** with one of the world's largest collections of nineteenth century art, was the occasion for PACE's exclusive look at this major addition to one of America's premiere museums.

- For the children, the **National Mime Week Touring Show,** taped at Knott's Berry Farm in California. A delightful and magical program for the whole family.

- **The Seattle Wagner Festival** is a documentary about the creation and performance of the great operatic works of Richard Wagner in the beautiful Pacific Northwest area. In preparation for this summer's events, PACE presents this documentary, filmed on location last year.

The April Editions of KEEPING PACE

- Your arts magazines of the air feature the following subjects: Drama, Dance, Film, Popular Music, Opera, Fashion, and Art. Don't miss them, because they provide a guide to the month's PACE programs in each department, as well as a round-up of the newest events and personalities in the world of performing arts, culture, and entertainment.

PACE Basic Schedule: April, 1980 (See program log for details)

Tuesday, April 1

6:30 YEHUDI AND HEPHZIBAH MENUHIN
8:00 NEW GLASS, an art documentary
9:00 THE ANDRE MEYER GALLERIES, Metropolitan Museum of Art
10:30 Keeping PACE: Art
11:00 Movie: *The War at Home*, by Silber/Brown

Wednesday, April 2

6:30 Children's play: *TV Dinner*
7:30 Keeping PACE: Popular Music
8:00 TITO PUENTE from New York
9:30 CHOREOGRAPHERS SHOWCASE
11:00 RENATA SCOTTO from Carnegie Hall

Thursday, April 3

7:30 Keeping PACE: Drama
8:00 Charles MacArthur's *Johnny on a Spot*
8:30 *Pennies from Heaven*
11:00 NEW GLASS, an art documentary
12:00 Movie: *Masculin/Feminin*, by Godard

Friday, April 4

7:30 Keeping PACE: Fashion
8:00 World TV premiere: Barnard Hughes in *Da*
10:00 Movie: A *Woman is a Woman*, by Godard
11:30 TITO PUENTE
1:00 Movie: *An American Friend*, by Wenders

Saturday, April 5

3:30 Keeping PACE: Film
4:00 Movie: (4-part cycle, with intermission features approximately every 1½ hours) *Our Hitler: A Film from Germany*, by Syberberg
12:00 JOHN CALE from Whiskey A Go Go, with THE ZEROS

Sunday, April 6

3:30 Movie: *Love on the Run* by Truffaut
5:00 Children: NATIONAL MIME WEEK TOURING SHOW
6:00 Keeping PACE: Opera
6:30 Movie: *Our Hitler: A Film from Germany*, Part III
8:00 THE SEATTLE WAGNER FESTIVAL, Documentary

9:30 Opera: Wagner's *Das Rhinegold*, from the Ring Cycle
11:00 Movie: *Two or Three Things I Knew About Her* by Godard

Monday, April 7
7:30 Keeping PACE: Popular Music
8:00 TITO PUENTE
10:00 *Da*
12:00 NEW GLASS, Documentary
1:00 Keeping PACE: Art

Tuesday, April 8
7:30 Keeping PACE: Dance
8:00 NATIONAL DANCE CO. OF SENEGAL
10:00 Dance: *Short Subjects*
11:30 Opera: Wagner's *Das Rhinegold*

Wednesday, April 9
6:30 Opera: Wagner's *Das Rhinegold*
8:00 Movie: *Madama Butterfly*, by Ponnelle
11:00 Keeping PACE: Opera
11:30 Movie: *Our Hitler*, Part I

Thursday, April 10
7:30 Keeping PACE: Film
8:00 Movie: *Our Hitler*, Part II
9:30 *Pennies From Heaven*
11:00 Movie: *A Woman is a Woman*, by Godard

Friday, April 11
7:30 Keeping PACE: Opera
8:00 Movie: *Don Giovanni*, by Losey
11:00 Movie: *Our Hitler*, Part III
1:00 TITO PUENTE

Saturday, April 12
3:30 Children: *TV Dinner*
4:30 Play: *Johnny on a Spot*
6:00 Movie: *Don Giovanni*
9:00 NEW ORLEANS JAZZ FESTIVAL
11:00 Keeping PACE: Popular Music
11:30 THE KITCHEN

Sunday, April 13
2:00 JOHN CALE, with THE ZEROS
4:00 NATIONAL DANCE CO. OF SENEGAL

6:00 Movie: *Masculin/Feminin*
7:30 Keeping PACE: Fashion
8:00 Movie: *Heads over Heels*, by Silver
10:00 Movie: *Two or Three Things I Knew About Her*, Godard
11:30 JOHN CALE, with THE ZEROS

Monday, April 14
7:00 Documentary: NEW GLASS
8:00 TEDDY WILSON: Master Class in Jazz Piano
9:30 Movie: *Head over Heels*
11:10 Movie: *A Woman Is A Woman*

Tuesday, April 15
7:00 Children's TV DINNER
8:00 Movie: *An American Friend*
9:30 NEW ORLEANS JAZZ FESTIVAL
11:30 Keeping PACE: Popular Music
12:00 YEHUDI AND HEPHZIBAH MENUHIN

Wednesday, April 16
7:30 Keeping PACE: Drama
8:00 Play: *Sorrows of Stephen*, Public Theater
9:30 Play: *They're Coming to Make It Brighter*, Actors Theatre of Louisville
11:00 Movie: *A Woman Is A Woman*

Thursday, April 17
7:30 Keeping PACE: Art
8:00 Movie: *Head over Heels*
9:30 *Pennies from Heaven*
11:00 Movie: *Our Hitler*, Part IV
12:30 Dance, CHOREOGRAPHERS SHOWCASE

Friday, April 18
8:00 Opera: *Tosca*, by Puccini
10:00 Keeping PACE: Opera
10:30 RENATA SCOTTO at Carnegie Hall
12:00 Opera: Wagner's *Das Rhinegold*

Saturday, April 19
3:00 Film: *Don Giovanni*, by Losey
6:00 Play: *Da*
8:00 Dance: MARTHA GRAHAM COMPANY
9:30 Play: *Sorrows of Stephen*
11:00 Keeping PACE: Drama

11:30 Movie: *Head over Heels*
1:00 Movie: *Our Hitler*, Part I

Sunday, April 20
2:30 Guilini and LOS ANGELES PHILHARMONIC, live
5:00 TITO PUENTE
8:00 New Orleans JAZZ FESTIVAL
9:30 TEDDY WILSON Master Class in Jazz Piano
11:00 Keeping PACE: Fashion
12:00 Movie: *Head Over Heels*

Monday, April 21
6:00 NATIONAL DANCE CO. OF SENEGAL
8:00 Opera: *Don Giovanni*
11:00 Movie: *Our Hitler*: Part III
12:30 TEDDY WILSON Master Class in Jazz Piano

Wednesday, April 23
7:30 Keeping PACE: Dance
8:00 Dance: SHORT SUBJECTS
9:30 Dance: MARTHA GRAHAM COMPANY
11:00 Movie: *A Woman Is A Woman*

Thursday, April 24
7:30 Children: *TV Dinner*
9:00 Longform Series: *V* by Pynchon: Part I.
10:30 Keeping PACE: Fashion
11:00 Play: *Da*

Friday, April 25
7:30 Keeping PACE: Film
8:00 Movie: *The War at Home*
9:30 Guilini and the LOS ANGELES PHILHARMONIC
12:00 Movie: *Two or Three Things I Knew About Her*

Saturday, April 26
3:00 Play: *Sorrows of Stephen*
4:30 Documentary: SEATTLE WAGNER FESTIVAL
5:30 MEYER GALLERIES, Metropolitan Museum of Art
6:30 Keeping PACE: Art
7:00 Children: *TV Dinner*
8:00 Play: *Johnny on a Spot*
9:30 NAM JUNE PAIK
11:30 Music and dance from THE KITCHEN
1:00 Movie: *An American Friend*

Sunday, April 27

3:30 Movie: Full cycle of *Our Hitler: A Film from Germany*
11:30 Keeping PACE: Opera
12:00 Longform series: *V*, Part I

Monday, April 28

7:00 NATIONAL MIME WEEK TOURING SHOW
8:00 Live concert: DIETRICH FISCHER-DIESKAU
10:00 Movie: *Love on the Run*
11:30 Play: *Sorrows of Stephen*

Tuesday, April 29

6:30 Concert: FISCHER-DIESKAU
8:30 Movie: *Our Hitler*, Part IV
10:00 Dance: MARTHA GRAHAM COMPANY
11:30 Keeping PACE: Dance
12:00 Play: *They're Coming to Make It Brighter*

Wednesday, April 30

7:30 Keeping PACE: Drama
8:00 Play: *They're Coming to Make It Brighter*
9:30 Play: *Da*
11:30 Movie: *Madama Butterfly*

Glossary of Acronyms

ACSN	Appalachian Community Services Network
AETN	American Educational Television Network
AF of M	American Federation of Musicians
AFTRA	American Federation of Television and Radio Artists
AMC	Alternate Media Center
Amsat	American Satellite Corporation
ANIK	Canadian communication satellite
Antiope	French teletext system
ATC	American Television and Communications Corporation
BBC	British Broadcasting Corporation
BPO	British Post Office
BREMA	British Radio Equipment Manufacturers Association
CAPTAIN	Character and Pattern Telephone Access Information Network developed by Japan's Ministry of Posts and Telecommunications
CATV	Community Antenna Television
CBC	Canadian Broadcasting Corporation
CCETT	French research center financed by PTT and TDF
CCIS	Community Communications Information System, a Japanese videotext system
Ceefax	BBC teletext system
CNN	Cable News Network
Comsat	Communications Satellite Corporation
Comstar	Comsat-owned satellite
CPB	Corporation for Public Broadcasting
C-SPAN	Cable Satellite Public Affairs Network
CTW	Children's Television Workshop

DATE	Digital Audio for Television
DBS	Direct Broadcast Satellite
DGA	Directors Guild of America
EIA	Electronic Industries Association
EIS	Electronic Information Service
ENG	Electronic News Gathering
ESA	European Space Agency
ESPN	Entertainment and Sports Programming Network
EVR	CBS's Electronic Video recorder
FCC	Federal Communications Commission
GHz	Gigahertz
GTE	General Telephone & Electronics
HBO	Home Box Office
HHT	Hollywood Home Theater
HI-OVIS	Highly Interactive Optical Video Information System
IATSE	International Alliance of Theatrical and Stage Employees
IBA	Independent Broadcasting Authority
IBEW	International Brotherhood of Electrical Workers
IBM	International Business Machines
Infocast	Teletext service for specialized users
INTELSAT	International Satellite Consortium, 102-nation member body
IP	Information Provider
ITU	International Telecommunications Union, an agency of the United Nations
ITV	Independent Television, British Commercial Television System
KDD	Japan's international carrier
KHz	Kilohertz
MATV	Master antenna systems
MBA	Minimum Basic Agreement
MDS	Multi-point Distribution Service by microwave transmission

MHz	Megahertz
MOT	Main Operations Terminal
MPAA	Motion Picture Association of America
MSO	Multiple System Operator
NABET	National Association of Broadcast Engineers and Technicians
NASA	National Aeronautics and Space Administration
NCTA	National Cable Television Association
NET	National Educational Television
NHK	Japanese television network
NPR	National Public Radio
NST	National Subscription Television
NTIA	National Telecommunications and Information Administration
OMNITEXT	Canadian videotext system
ORACLE	Optional Reception of Announcements by Coded Line Electronics, ITV teletext system
PBS	Public Broadcasting Service
PKA	Paul Kagan Associates
PSSC	Public Service Satellite Consortium
PTF	Public Telecommunications Facilities Program of NTIA
PTL	Public Television Library
PTT	Secrétariat d'Etat aux Postes et Telecommunications in France
QUBE	Interactive cable system in Columbus, Ohio
RCA Americom	RCA American Communications, Inc.
SAG	Screen Actors Guild
SBS	Satellite Business Systems
SCA	Subsidiary Communications Authority
SMSA	Standard Metropolitan Statistical Areas
The Source	A viewdata service
SPC	Station Program Cooperative
SSS	Satellite Syndicated Systems
STV	Subscription Television

TCA	Telecomputing Corporation of America
TCN	Telecommunications Cooperative Network
TDF	TeleDiffusion de France
TDRSS	Tracking & Data Relay Satellite System
Telidon	Videotext system created by Communications Research Center of the Canadian Department of Communications
TICCIT	Wideband two-way teletext system in Reston, Virginia
Tocom	Cable security service
TORUS	Antenna simultaneously transmitting or receiving as many as seven signals
TVRO	Receive-only earth terminals
UHF	Ultra High Frequency
U-Matic	Sony's ¾-inch format cassette machine
USDA	U.S. Department of Agriculture
VBI	Vertical blanking interval transmission lines
VCA	Viewdata Corporation of America
VCR	Videocassette Recorder
VHF	Very High Frequency
VHS	Masushita cassette recorder/playback system
VISTA	Videotext system being developed in Canada by Bell Canada and the Toronto Star
VLSI	Very large-scale integrated circuits
VPS	Video Program Service of PBS
WARC	World Administrative Radio Conferences
WESTAR	Western Union communications satellite
WGA	Writers Guild of America
WTBS	An independent broadcast station in Atlanta, the first "superstation," distributing its programming by satellite.

Some public television stations named in report

KCET — Los Angeles
WETA — Washington, D.C.
WGBH — Boston
WNET — New York
WTTW — Chicago

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